

# HITACHI

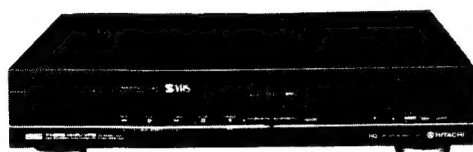
## SERVICE MANUAL

TK

No.2963E

**VT-S80E(CT)**  
**VT-S85E(VPS)**

## Technical Data



### SPECIFICATIONS

Format:	S-VHS PAL Standard
Recording:	Rotary Two-Head Helical Scan Azimuth Recording
Tape Speed:	23.39 mm/sec. (SP mode), 11.7 mm/sec. (LP mode)
Tape Width:	12.7 mm
Operation Temperature:	5°C to 40°C
Video:	PAL colour (system B & G) & CCIR monochrome signals 625 lines
Recording Time:	240 min. (SP mode)/480 min. (LP mode)....with E-240 cassette
Aerial Input:	VHF channels U1 — U5 CATV channels S1 — S20 HYPER S21 — S41 UHF channels 21 — 69
RF Output:	UHF channels 37 (30 — 39 adjustable) (System G)
Video Input:	VIDEO IN : 0.5 to 1.5Vp-p 75 ohm Unbalanced S-VHS IN Y: 0.5 to 1.5Vp-p, 75 ohm Unbalanced C: 0.3Vp-p, 75 ohm Unbalanced
Video Output:	VIDEO OUT : 1Vp-p 75 ohm Unbalanced S-VHS OUT Y: 1Vp-p, 75 ohm Unbalanced C: 0.3Vp-p, 75 ohm Unbalanced
S/N Ratio (Video):	More than 43 dB
Horizontal Resolution:	Colour 260 lines
Audio (Linear)	
Input:	—7.8 dBs 50 Kohm
Output:	—7.8 dBs 1 Kohm
S/N Ratio:	43 dB
Frequency Range:	70 Hz to 12 kHz
Hi-Fi Audio	
Frequency Range:	20 Hz to 20 kHz
Dynamic Range:	More than 90 dB
Wow and Flutter:	Less than 0.005% WRMS
Power:	AC 220V 50 Hz
Power Consumption:	49W (including timer)
Timer:	24 hour digital indication
Cabinet Size:	435 mm(W) x 92 mm(H) x 375 mm(D)
Weight:	Approx. 8.5 kg
Accessories Included:	1 — Aerial cable 1 — Infrared remote control unit 1 — Audio cable 1 — S-Connector cable 2 — Batteries

\* Design and specifications are subject to change without notice.

**VHS**

This video deck is a VHS type video recorder. For proper operation, only the VHS type cassette must be used.

### Manuals related to the VT-S80E(CT)/VT-S85E(VPS)

Name of Manual	Language	Manual No.	Chapters included
Technical Data	English	2963E	Chapter 1—6
	Deutsch	2964G	Kapitel 1—6
Technical Information	English	2965E	—
	Deutsch	2966G	—

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

## VIDEO CASSETTE RECORDER

March

1989

TOKAI WORKS

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#### SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine Hitachi replacement parts. Especially critical parts in the power circuit block should not be replaced with other makers' parts! Critical parts are marked  in the schematic diagrams.
2. Before returning a repaired unit to the customer, the servicing technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

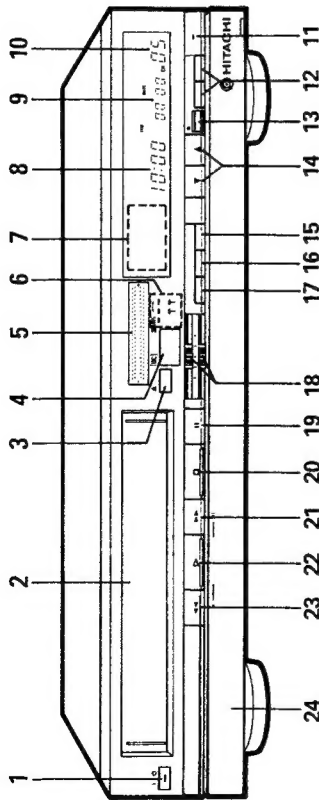
## COMPARISON WITH PREVIOUS MODEL

ITEM	VT-S80E(CT)/VT-S85E(VPS)	VT-580E(CT)/VT-585E(VPS)
FEATURES		
RECORDING FORMAT	S-VHS/VHS	VHS
VIDEO SIGNAL SYSTEM	PAL	PAL
TUNER SYSTEM	I PAL	I PAL
TUNING SYSTEM	FREQUENCY SYNTHESIZER (AUTO TUNING)	FREQUENCY SYNTHESIZER (AUTO TUNING)
RESET CHANNEL	69CH	69CH
TIMER RECORDING	8 PROGRAMMES/1 YEAR	8 PROGRAMMES/1 YEAR
TIMER BACK-UP	15 MIN.	15 MIN.
INSTANT RECORDING TIMER	PROVIDED	PROVIDED
VISUAL SEARCH SPEED	SP:×5, ×9 LP:×9, ×18	SP:×5, ×9 LP:×9, ×18
SLOW PLAY	PROVIDED (VARIABLE SLOW)	PROVIDED (VARIABLE SLOW)
FRAME ADVANCE	PROVIDED (BY REMOTE CONTROL)	PROVIDED (BY REMOTE CONTROL)
VIDEO DUBBING	PROVIDED	PROVIDED
PICTURE CONTROL	PROVIDED	PROVIDED
AUDIO RECORDING SYSTEM	VHS Hi-Fi	VHS Hi-Fi
AUDIO DUBBING	PROVIDED	PROVIDED
Hi-Fi RECORDING CONTROL	PROVIDED	PROVIDED
SIMULCAST RECORDING	PROVIDED	PROVIDED
CATV/HYPER RECEIVED	POSSIBLE	POSSIBLE
BILINGUAL RECEIVED	POSSIBLE	POSSIBLE
INDEX	PROVIDED	PROVIDED
AUTO OPERATE ON	PROVIDED	PROVIDED
AUTO PLAY	PROVIDED	PROVIDED
AUTO REWIND SHUT OFF	PROVIDED	PROVIDED
ENDLESS PLAY	PROVIDED	PROVIDED
AUTO/COLOUR SWITCH	PROVIDED	PROVIDED
AUDIO AUTO/NORM. SWITCH	PROVIDED	PROVIDED
ON SCREEN DISPLAY	PROVIDED	PROVIDED
CAMERA PAUSE SOCKET	PROVIDED	PROVIDED
VIDEO PROGRAM SYSTEM (VPS)	VT-S85E(VPS) : PROVIDED VT-S80E(CT) : NOT PROVIDED	VT-585E(VPS) : PROVIDED VT-580E(CT) : NOT PROVIDED
DIGITAL TRICK PLAY	NOT PROVIDED	PROVIDED
DIGITAL EFFECT	NOT PROVIDED	PROVIDED
CHASSIS		
BASIC CHASSIS TYPE	Z TYPE	Z TYPE
VIDEO HEADS	5 HEADS + Hi-Fi SP:2 (+48 $\mu$ m/-48 $\mu$ m) LP:2 AMORPHOUS HEAD (+30 $\mu$ m/-30 $\mu$ m) Hi-Fi AUDIO:2(+23 $\mu$ m/-23 $\mu$ m) FLYING ERASE HEAD:1	3 HEADS + Hi-Fi SP:2 (+57 $\mu$ m/-57 $\mu$ m) TRICK PLAY:1 (-57 $\mu$ m) Hi-Fi AUDIO:2(+23 $\mu$ m/-23 $\mu$ m) FLYING ERASE HEAD:1
CAPSTAN DRIVE	DIRECT DRIVE	DIRECT DRIVE
CYLINDER MOTOR	THREE-PHASE OUTER ROTOR:360Hz	THREE-PHASE OUTER ROTOR:360Hz

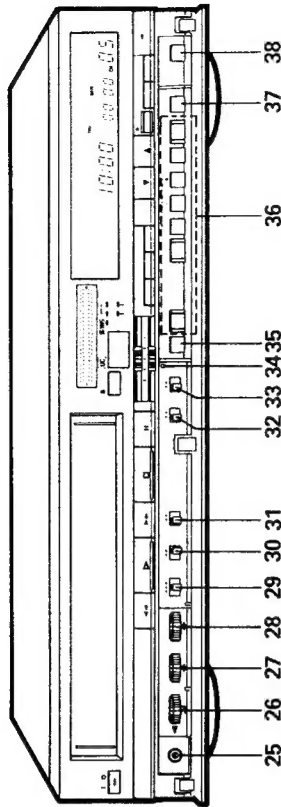


COMPARISON OF MAIN CONTROL ICs

ITEM		VT-S80E(CT)/VT-S85E(VPS)	VT-580E(CT)/VT-585E(VPS)
VIDEO SYSTEM	Y. SIGNAL PROCESS	HT4927E (IC201)	HT4847F (IC201)
	S VHS DISCRI/FM EQUALIZER	HT7131C (IC202)	—
	SUB EMPHASIS	HT7124 (IC203)	—
	VIDEO EQUALIZER	HTS7129B (IC204)	—
	VERTICAL SAG CORRECT	HES8044B (IC205, IC405)	—
	TITLE ADDER	HES8068B (IC206)	—
	PICTURE CORRECTOR	—	HT4848B (IC202)
	DETAIL ENHANCER	—	HES8020A (IC204)
	CHROMA SIGNAL PROCESS	HT4909C (IC301)	HT4809 (IC301)
	SECAM DETECTOR	HES8074A (IC351)	BA7025L (IC351)
	ACC	BA7267S (IC352)	—
PRE/REC AMP	PRE/REC AMP	HA118021MP (IC1)	HA118017 (IC1)
	FM AUDIO PRE/REC AMP	HA12115MP (IC2)	HA12115MP (IC2)
Y/C SEPARATE	Y/CHROMINANCE SEPA.	HA118083NT (IC2201)	—
	IH DELAY	MS736 (IC2202)	HT-4664A (IC203)
	1/2 H SKEW DETECTOR	BA7023L (IC2302)	—
	CHROMA SKEW SWITCH	HA118099NT (IC2303)	—
	LUMINANCE SKEW SWITCH	HA118070 (IC2304)	—
	0.5H/0.5H/1H DELAY	PLT6230 (IC2309)	—
ON SCREEN DISPLAY	CHARACTER GEN. SYNC SEPARATOR	PLT-623-0008 (IC1401)	M50455-003SP (IC1401) NJM2229S (IC1402)
	CHARACTER ADDER	HES8077 (IC1404)	—
JACK	VIDEO IN SELECT SW	BA7604 (IC1501)	LA7016 (IC1501-1504)
	TITLE SELECT SW	NJM2248S (IC1502)	—
	VIDEO/Y SELECT SW	LA7016 (IC1550)	—
AUDIO SYSTEM	COMPRESSOR/EXPANDER	BA7220S (IC401)	BA7220S (IC401)
	REC LEVEL CONTROL	M51131L (IC402)	M51131L (IC402)
	LINE AMP/BUFFER	M5218L (IC403, IC405, IC451, IC452)	M5218L (IC403)
	INPUT/OUTPUT SWITCH	HA12139N (IC501)	HA12117NT (IC501)
	FM MOD/DEMODULATOR	HA12118NT (IC503)	HA12118NT (IC503)
	MPX AUDIO DEMOD	MIC3803 (IC1801)	IR-3P02 (IC1801)
	5V REG.	TDA3803 (IC1802)	—
SERVO SYSTEM	SPEED/PHASE CONTROL	HD49726 (IC601)	HD49716 (IC601)
	TRICK PLAY CONTROL	M54874P (IC602)	M54874P (IC602)
	CYLINDER MOTOR DRIVE	HA13403V (IC603)	HA13403 (IC603)
	CAPSTAN MOTOR DRIVE	TA8408F (IC1601)	TA4808F (IC1601)
SYSTEM CONTROL	SYSTEM CONTROL $\mu$ P	HD4074008A03S3 (IC901)	HD614088SB99 (IC901)
	LOADING MOTOR DRIVE	BA6209U4 (IC902)	BA6209U4 (IC902)
	INDEX $\mu$ P	—	HES8026D (IC904)
TIMER	TIMER $\mu$ P	M50955-679 (IC701)	M50955-679 (IC701)
	EAROM	M58630P (IC702)	M58630P (IC702)
TIMER SUB	ON SCREEN DISPLAY $\mu$ P	HD6074008F (IC2701)	HD4074008F (IC2701)
CH-TUNING SYSTEM	TUNING CONTROL	HES8457B (IC801)	LA7935 (IC801)
POWER SUPPLY	REGULATOR	STK5372H (IC851)	STK5372H (IC851)
VPS	VPS SLICER	HES8052 (IC1406) (For S85E(VPS))	SDA5233 (IC1101) (For S85E(VPS))
	VPS DECODER	—	SDA5640 (IC1102) (For S85E(VPS))



1. **OPERATE SWITCH**  
Turn system power on and off.
2. **CASSETTE COMPARTMENT**  
Insert a cassette through the door, and loading will be completed automatically.  
Note: Power is turned on automatically when the cassette is loaded.
3. **EJECT BUTTON**  
Press to remove cassette.
4. **INFRARED RAY RECEIVING SECTION**  
Receives infrared rays from remote control unit.
5. **PEAK LEVEL INDICATOR**  
Shows the peak input levels of each audio channel during recording and the recorded levels during playback.
6. **INDICATORS**  
S-VHS: Lights when the VTR is in the S-VHS mode.  
HI-FI/CH 1,2: Controlled with the AUDIO select switch and CH 1/2 button. These indicators show the soundtrack to be played back or monitored.  
STEREO: Will light when tuned to a stereo broadcast.  
BILINGUAL: Will light when tuned to a bilingual broadcast.
7. **MODE INDICATORS**
  - " " appears when a cassette is in the compartment.
  - "PLAY" appears during the playback mode.
  - "REC" appears during the record mode.
  - " " appears during the rewind mode and flashes during rewind visual search mode.
  - " " appears during the fast forward mode and flashes during forward visual search mode.
  - " " appears during the play/record pause mode.
  - " " appears when turning the power off and either the timer has been programmed or IRT is turned on.
  - "INDEX" appears when turning the index function on.
8. **DIGITAL TIMER DISPLAY**  
This normally shows the time and day of the week.
9. **DIGITAL DATE/COUNTER/REMAIN DISPLAY**  
This shows the current date when the VTR power is turned off or shows the tape counter or time remaining of tape when the VTR power is turned on.
10. **CHANNEL INDICATOR DISPLAY**  
This shows the channel number corresponding to the channel selected.
11. **A.DUB INDICATOR**  
Lights when the VTR is audio dubbing.
12. **INSTANT RECORDING TIMER (IRT) BUTTONS**  
This allows unattended recording.  
Timer will switch the VTR off automatically at a pre-selected time. This is convenient when you go out during recording.
13. **REC BUTTON**  
Press REC button to record.
14. **CHANNEL SELECT BUTTONS**  
Select the channels you wish to view or record by pressing these buttons.  
And you can also select the "AU" position\* by pressing this button to record or watch the programme input at the video/audio in or EURO jack.  
Note: One channel position either higher or lower outside the range of your preset channels.
15. **MEMORY BUTTON**  
Press this button so "M" is indicated in the display, then fast forward or rewind the tape. The tape stops when the counter reaches approximately "0000".  
Note: Press the button again to switch off the "M" indicator.
16. **COUNTER RESET BUTTON**  
To reset counter to "0000".
17. **COUNTER/REMAIN SELECT BUTTON**  
Press to switch from counter display to tape remain display.

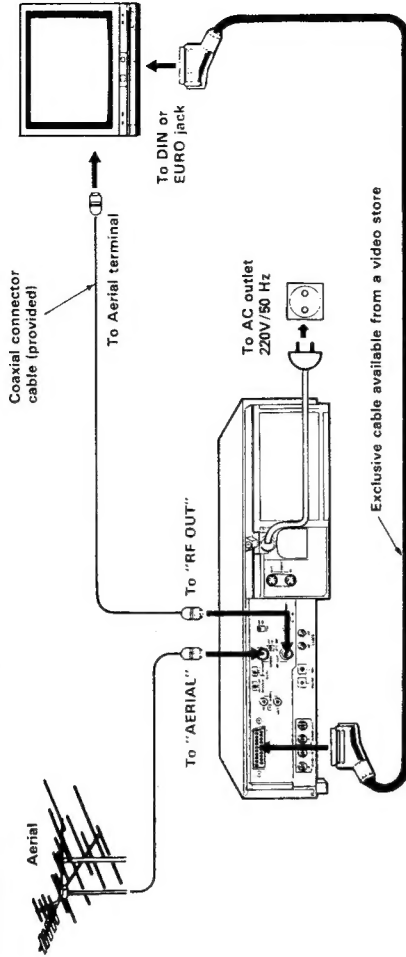


18. **RECORDING LEVEL CONTROLS**  
When recording with ALC switch set to "OFF" adjust these controls so that +7 dB segments light occasionally (during especially loud portions).
19. **PAUSE BUTTON**  
Press to pause during recording.  
Press to view a still picture during playback.  
Press again to release.
20. **STOP BUTTON**  
The STOP button must be pressed between "RECORD" and any other operation.
21. **F.FWD/VISUAL SEARCH BUTTON**  
Press to activate fast forward.  
Press this button during playback and forward playback picture at high speed can be seen.
22. **PLAY BUTTON**  
Note: When the cassette (with erase prevention tab removed) is loaded, playback starts automatically.  
Press to start rewind.  
Press this button during playback and reverse playback picture at high speed can be seen.
23. **REW/VISUAL SEARCH BUTTON**  
Press to start rewind.  
Press this button during playback and reverse playback picture at high speed can be seen.
24. **SECONDARY CONTROL DOOR**
25. **HEADPHONE SOCKET**  
Plug a headphone into this socket and adjust the volume with the PHONES LEVEL control.
26. **PHONES LEVEL CONTROL**  
Adjusts the output level for headphones.
27. **PICTURE CONTROL**  
Adjust the picture so it is easy to see.
28. **TRACKING CONTROL**  
To minimize noise in playback.
29. **AUDIO SELECT SWITCH**  
Selects the linear audio playback or automatic selection of HI-FI VHS sound recorded on the tape. Normally set it to AUTO position.
30. **MPX SWITCH**  
Set this switch to "ON" when recording an FM programme to reduce the slight noise from the FM tuner. Set this switch to "OFF" when recording sound other than FM.
31. **AUX SELECT SWITCH**  
Set to A/V when recording signals input through the EURO jack on the rear panel, and set to LINE when recording signals from the AUDIO IN and VIDEO IN or S-VHS IN jacks.  
With either selection, operate the CHANNEL select button to display "AU" in place of a channel number.
32. **EDIT SWITCH**  
Turn this switch on when using this VTR for playback during dubbing. The dubbed tape will provide clearer pictures. This function does not work when using this VTR for recording.
33. **ALC SWITCH**  
When you set this switch to the "ON" position, the recording level is controlled automatically. When you set it to the "OFF" position, the audio recording level must be adjusted manually.
34. **RESET SWITCH**  
Press this switch if the digital display malfunctions or no operation mode can be engaged to reset the display. Set the clock to the correct present time.
35. **REC SPEED SELECT BUTTON**  
Select the tape speed; SP (Standard Play) or LP (Long Play) for recording. When LP is selected, "LP" appears in the OSD and VTR's display. When SP is selected, "SP" appears only in the OSD. The playback speed is automatically set to the speed used in recording.

## INSTALLATION

Since there are many different types of TV, there are several ways to connect. Connect the aerial to the VTR then connect the VTR to the TV.

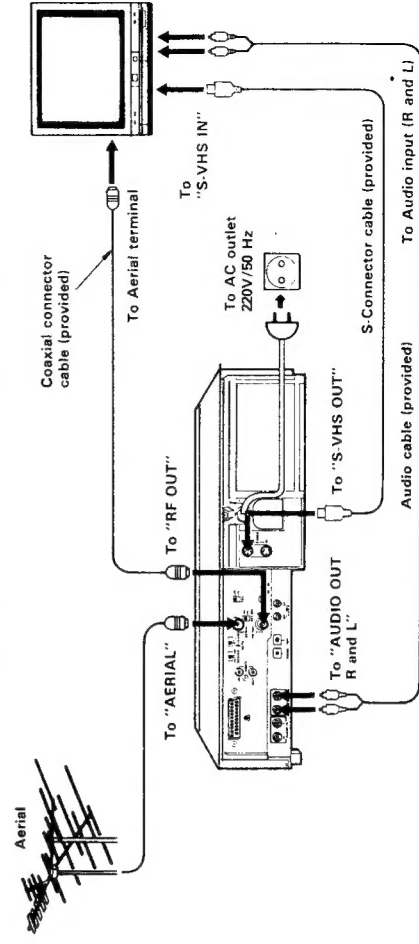
**Example 1** If your TV set has a DIN or EURO jack, follow the connection below.



With this connection method:

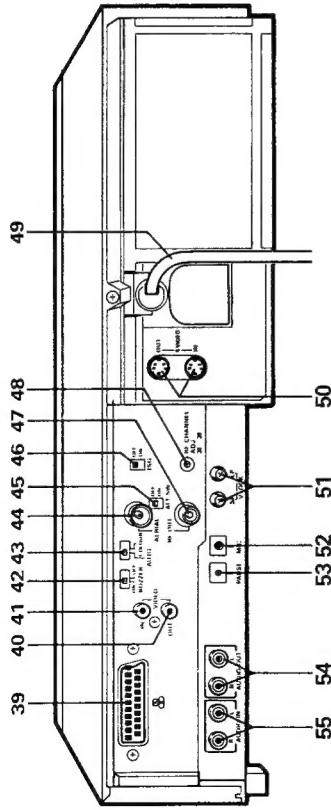
- During playback, the signals from the EURO jack of the VTR are fed to your TV. To receive these signals, your TV must be set to the video input mode.
  - You can record the programme selected by the channel select button of the TV set. In this case, press the CHANNEL select button (forward or reverse) so the "AU" indication lights in the VTR display instead of a channel number, then set the AUX select switch in the door to the A/V position.
- Note:** You can also select "AU" by pressing buttons [9] and [1] on the remote control unit.

**Example 2** If your TV set has S-VHS IN and AUDIO IN jacks, follow the connections below.



With this connection method:

- During playback, the signals from the S-VHS OUT and AUDIO OUT jacks of the VTR are fed to your TV. To receive these signals, your TV set must be set to the video input mode.
- Note:** Be sure to connect the separate audio cable. The S-connector cable does not carry audio.



### 36. CLOCK/TIMER/CHANNEL PRESET BUTTONS

#### 37. VPS OFF BUTTON

See page 15 for complete information.

#### 38. A DUB BUTTON

Use this button to dub new sound on the previously recorded tape.

#### 39. EURO JACK

For connection with a TV with a EURO or DIN jack using an exclusive cable. See your dealer for details.

#### 40. VIDEO OUT

Permits video connection of your unit to a TV receiver or another VTR.

#### 41. VIDEO IN

Receives the video signal from another VTR or a video camera.

#### 42. BUZZER SWITCH

When this switch is on, a beep sound will be heard when any VTR operation button is pressed. This is a convenience in operation.

To stop this function, turn the switch off.

#### 43. AUTO/COLOUR SWITCH

**AUTO:** Circuits are automatically switched to colour or black/white mode. Set to this position when playing or recording a PAL signal.

**COLOUR:** When recording a PAL signal in an area far from the broadcasting station, the recorded picture may lose colour. In this case, set to this position in recording and playback.

#### 44. AERIAL INPUT SOCKET

Connect an external aerial.

#### 45. ATTENUATOR SWITCH

Generally set to the OFF position. Set to "ON" when interference occurs in an area with a strong signal.

### 46. TSG ON/OFF SWITCH

Set to ON and check that the video channel of your TV set is correct. After setting, set this switch to OFF.

### 47. RF OUTPUT

Connect to TV aerial input.

### 48. RF CHANNEL CONTROL

Turn TSG ON/OFF switch to "ON" and rotate this control to set the video channel correctly.

### 49. MAINS LEAD

### 50. S-VIDEO IN/OUT

These are the input and output sockets for the separated luminance "Y" and chrominance "C" components of the video signal. Connections to these sockets will result in clearer pictures.

When using these sockets, also connect the separate audio cable as these sockets don't carry audio.

### 51. V LOCK CONTROLS

If you see vertical shaking on the TV screen in the still playback mode, rotate these controls to minimize shaking.

### 52. MIC JACK

Connect the microphone for audio dubbing.

### 53. CAMERA PAUSE JACK

Connect camera pause cable.

### 54. AUDIO OUT (L), (R)

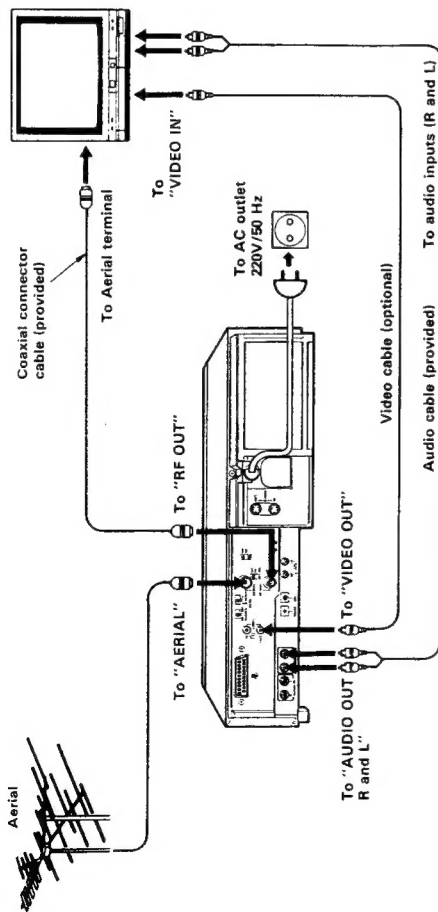
Permits audio connection of your unit to a TV receiver or another VTR.

### 55. AUDIO IN (L), (R)

Receives audio signals from a camera, external sound equipment or from another VTR.

## PRE-TUNING OF BUILT-IN TV TUNER

This VTR incorporates a complete television tuner with the required tuning controls. Once you have pre-tuned to preferred stations, you can select any of them by merely pressing the CHANNEL select button. Before pre-tuning TV stations, set the clock time.

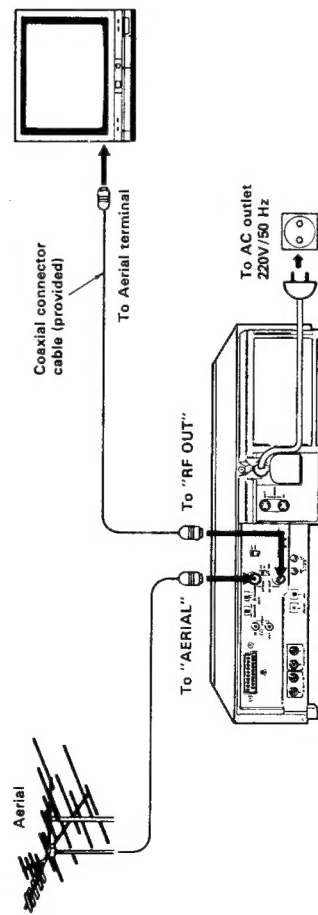


**Example 3** If your TV set has VIDEO IN and AUDIO IN jacks, follow the connections below.

With this connection method:

- During playback, the signals from the VIDEO OUT and AUDIO OUT of the VTR are fed to your TV set. To receive these signals, your TV set must be set to the video input mode.

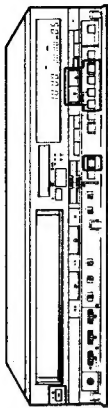
**Example 4** If your TV set does not have the above jacks, follow the connection below.



With this connection method:

- The signals from the RF OUT of the VTR are fed to your TV set. To receive these signals, select the video channel with the TV's channel button.
- To receive stereo sound, connect the AUDIO OUT (R and L) jacks of the VTR to the audio input (left and right) jacks of a stereo system.
- The advantages of the S-VHS system are not available with this connection.

## User's controls



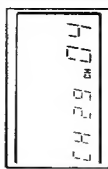
### Notes:

- Press the Forward SET (+) button; channels are scanned in the order VHF (2 - 12) → UHF (21 - 69) → CATV (S1 - S20) → HYPER BAND (S21 - S41) → VHF (U1 - U5); the colon (:) blinks when scanning CATV and HYPER channels.
- Press Reverse SET (-) button; channels are searched in the reverse order to the above.

### VHF (2-12) & UHF (21-69) Channels Direct Preset

Press the 10 key buttons on the remote control unit instead of step 4 to preset desired VHF and UHF channels.

To preset UHF channel 29 in the channel position 04, for example, press the CHANNEL select button to display the channel position "04" (in step 3) then press [2] [9] on the remote control unit.

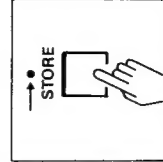


### 5

Press the STORE button when the desired station is reached.

"--" will be displayed.

Note: If the TV programme of broadcast by a preset channel does not appear clearly, press the Forward or Reverse SET (+ or -) button to fine tune the channel. After fine tuning is completed, press the STORE button again.



### 6

Follow the same steps as explained in steps 3 through 5 above for other stations.

You can preset up to 69 channels in memory.

### 7

After having completed tuning all broadcast stations you want, press the PRESET button once again.

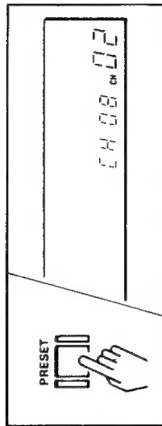
These stations preset in memory as shown in the above can be selected by the CHANNEL select buttons on the VTR.

### 1

Turn on the Operate switches of the VTR and the TV, then set the TV to the pre-tuned video channel.

### 2

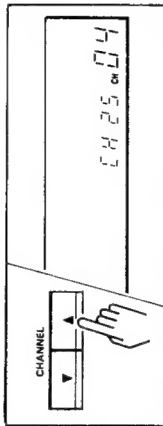
Press the PRESET button once.



The display indication changes from the clock time display to the channel display.

### 3

Press the CHANNEL select button on the VTR to select the channel to be memorized.

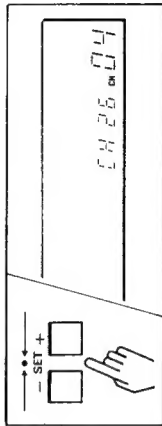


For example, the above diagram shows that channel 4 has been selected.

Note: The Channel Number Display can be now consecutively selected from "01" through "69" and "AU" by pressing the CHANNEL select button either upward or downward. In this case, the Channel Number may be any number.

### 4

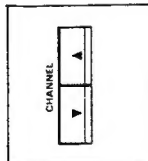
Press and release the SET button (Forward or Reverse) to start tuning.



At a station that is broadcasting, the picture appears on the TV screen. If the station received is different from the station to be preset, press SET button (Forward or Reverse) again. At the next station, the searching will stop and the new station can be preset. Repeat this until the desired station is reached.

### Channel selection

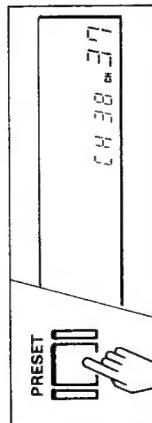
The channel up and down controls on the VTR permit advancing the tuner directly to the next higher or lower programmed channel.



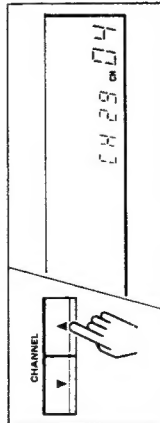
### Eliminating unwanted preset channels

You can rearrange the desired channels by eliminating unwanted preset channels for channel up/down tuning.

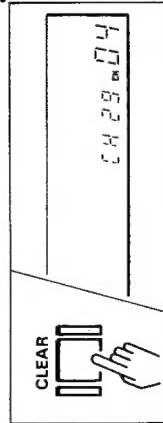
- 1 Press the PRESET button once.



- 2 Press the CHANNEL select buttons until an unwanted channel is found.



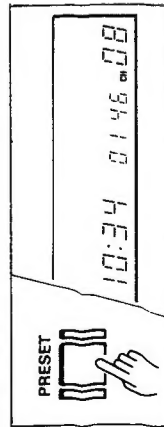
- 3 Press the CLEAR button once.



Sound will go off indicating the channel has been erased from memory.

- 4 Repeat steps 2 and 3 until all unwanted channels have been erased.

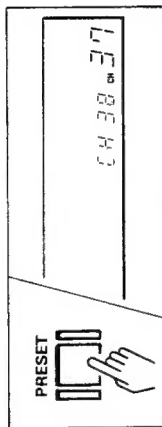
- 5 After eliminating them, press the PRESET button once again.



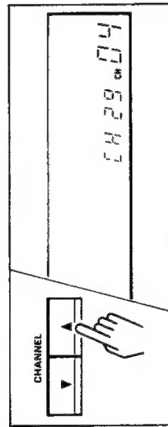
### Adding channels

You can preset channels again which have previously been eliminated because they were unwanted.

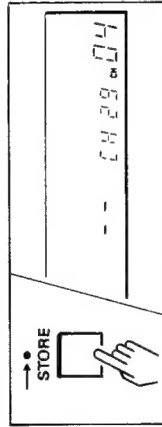
- 1 Press the PRESET button once.



- 2 Press the CHANNEL select buttons until the channel which has been previously eliminated and you desire to preset again is found.



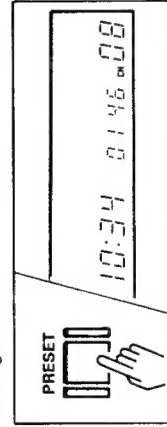
- 3 Press the STORE button.



Sound will come on indicating the channel has been added to memory.

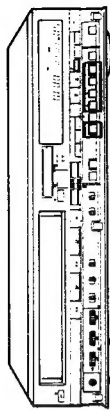
- 4 Repeat step 2 and 3 for other channels if desired.

- 5 After adding channels, press the PRESET button once again.



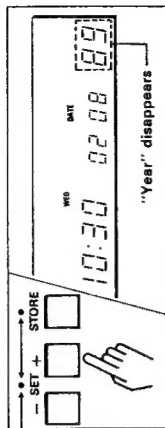
## CLOCK TIME SETTING

The built-in digital clock is based on a 24-hour cycle and gives you a constant readout of the time and day. The clock time can also be set with the remote control unit provided. See the supplementary manual for operating procedure.



### User's controls

- 4 Repeat steps 2 and 3 to set minute, day, month and year.



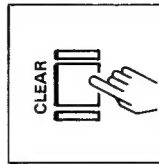
The day of week appears automatically after the year has been entered. The year disappears from the display when the STORE button is pressed.

For example, the diagram shows that 10:30 WED, 2 of August 1989 have been set.

Now the clock has been set to the correct time and date.

### To correct an error during setting

You can correct an error in the setting any time before the last step by pressing the CLEAR button repeatedly until the digit to be corrected is flashing. Then enter the correct digit and continue the setting sequence.



### Notes:

- This VTR has a built-in power failure compensation circuit. If a power interruption of less than 15 minutes occurs, the clock time will not be lost.
- The digital display is bright when the OPERATE switch is turned ON and automatically becomes dim when the switch is off.
- When the time set by the remote control unit provided is transferred to the VTR, the transferred information is displayed on the TV screen for about 8 seconds.

DAY/MONTH/YEAR

2 AUG 89

10:30

## S-VHS AND HI-FI SOUND

### ■ S-VHS

**S-VHS** has realized high resolution (a horizontal resolution of 400 lines or more) and high picture quality when compared to the standard **VHS** format.

### Usable Cassette Tapes

TAPE TYPE	RESULT OF RECORDING	RESULT OF PLAYBACK
Standard VHS	Standard VHS	Standard VHS
S-VHS	Switchable between Standard VHS and S-VHS	Automatic selection of standard VHS and S-VHS

- Use a videocassette with an **S-VHS** mark.
- Cassettes with an **S-VHS** mark can be recorded in both the **S-VHS** and **VHS** formats.
- You can use cassettes with a **VHS** mark, but the recording will be in the **VHS** format.

### Compatible With Standard **VHS** Recorders

TAPE TYPE	RESULT OF PLAYBACK
Standard VHS	Standard VHS
S-VHS	Not usable (No picture)

- Tapes recorded in the **S-VHS** format can be played only by recorders with an **S-VHS** mark.
- You can switch this VTR to record in both the **S-VHS** and **VHS** formats.
- This VTR discriminates between the **S-VHS** and **VHS** recording formats automatically in playback.

### TVs That Can Be Connected

- Tapes recorded in the **S-VHS** format produce high quality pictures with high resolution. It is therefore better to connect this VTR to a high picture-quality, high-resolution TV to fully enjoy the superb performance of the VTR. We recommend TV sets with S-VHS IN jack, Audio and Video input jacks or a EURO jack.

### ■ HI-FI SOUND

This VTR records sound using the following two formats.

#### Hi-Fi sound

FM sound recorded using the rotary audio heads.

#### Normal (linear) sound

Records in monaural using the same format as with a non-Hi-Fi VTR. Therefore, conventional VTRs can be used for playback.

### Remarkable Specifications of Hi-Fi Sound

- Dynamic range 90 dB
- Frequency response 20 Hz — 20 kHz
- Wow and flutter 0.005% or less

### S-VHS IN Jack

This VTR has S-VHS IN/OUT jacks on the rear panel which input (output) the video signal after separation into luminance (Y) and chrominance (C) signals. Connecting these jacks to a TV set gives a picture that is much clearer than can be obtained from the signal supplied through the conventional video jack.

- The "S" in the S-VHS IN/OUT jacks stand for "Separate Y/C".

### Selecting the **S-VHS** and **VHS** format

- Point the remote control at the front of the VTR then press the OSD button. TV screen shows the OSD menu.



- Press button [4] to turn the **S-VHS** system on and off.
- To play back tape through the EURO jack located on the back of VTR, press the button [5] to turn the **S-VHS** system on and off.

- Press the OSD button to erase the OSD menu.  
Note: Normally select the **S-VHS** ON mode. This way, if you insert an **S-VHS** cassette, the VTR will record in the **S-VHS** format. If you insert a standard cassette, the VTR will automatically record in standard **VHS** format. Select the **S-VHS** OFF mode only if you want to record on an **S-VHS** tape and to play it in a standard **VHS** VTR that does not have the **S-VHS** format.

### Recording stereo broadcasts

- Stereo programmes are recorded in Hi-Fi on both the L and R channels and also recorded on the linear track as monaural.

### Recording bilingual broadcasts

- Both main speech and sub speech sounds are recorded on the Hi-Fi audio tracks separately.
- Only main speech sound is also recorded on the linear audio track.

### Audio dubbing

- The sound is recorded on the linear track. (The previously recorded sound will be erased.)
- The sound on the Hi-Fi track remains without being erased.
- The required sound on the dubbed tape can be heard during playback by changing over the AUDIO select switch.

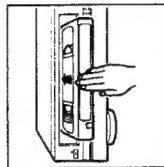
## RECORDING TV PROGRAMMES



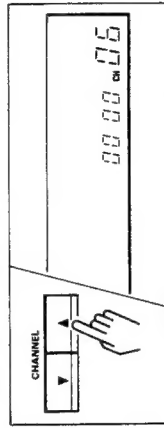
### User's controls

#### 1 Insert a cassette.

Note: Be sure to check that the erase prevention tab is not missing. If it is removed, the VTR goes into playback mode automatically.

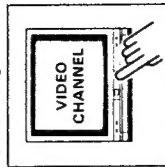


#### 2 Select the channel to be recorded by pressing the CHANNEL select buttons.



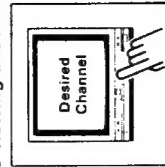
#### To view same programme while recording

You can view same programme while recording by merely selecting the video channel with your TV channel button.



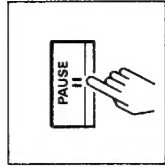
#### To record one programme while viewing another

You can record one programme while viewing another by merely selecting the channel you want to view with your TV channel button. The recorded programme can be viewed later at your convenience.



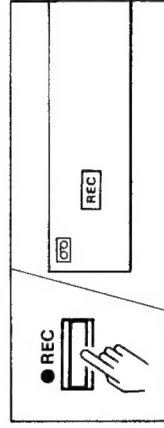
### Notes:

- If you wish to avoid recording unwanted material, press the PAUSE button. Press the PAUSE button again to release the pause mode. To prevent tape damage, do not leave the unit in the pause mode for more than 5 minutes.
- If you want to change channels while in the record mode, press the PAUSE button then select the desired channel.



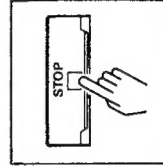
- Press the PAUSE button to release the pause mode.
- If the cassette in the VTR has its safety tab removed, the VTR will eject it when the REC button is pressed.
- Your TV does not have to be on to make a recording because the VTR records TV programmes without the aid of your TV. Its only use is for monitoring.

#### 4 Press the REC button.



Now, recording starts.

#### 5 After finishing recording press the STOP button.

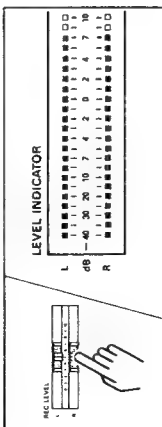




### Recording level adjustment

When recording is performed with the ALC switch set to "ON", the sound is automatically recorded at the optimum level.

However, when recording sound from audio equipment, Hi-Fi sound may be more faithfully recorded and played back by manually adjusting the recording level with the ALC switch set to "OFF".



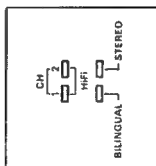
To adjust the Hi-Fi audio recording level, set the ALC switch to "OFF", then adjust the Recording level control so that the +7 dB segments light occasionally, when especially loud portions are being recorded.

**Note:** The recording level of the normal sound track is always set automatically.

### Recording broadcast stereo TV

The basic procedure for recording broadcast stereo TV is the same as it is for normal off-the-air recording.

The STEREO indicator will come on if the station is broadcasting in stereo.

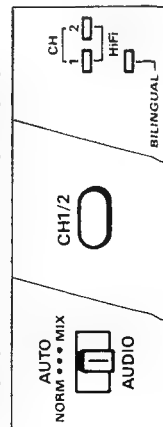


### Recording bilingual broadcast

The basic procedure for recording a bilingual programme is the same as it is for normal off-the-air recording.

The BILINGUAL indicator will come on if the station is broadcasting in bilingual.

**Note:** You can monitor the desired audio channel with the CH1/2 select button on the remote control unit. Set the AUDIO select switch to "AUTO", then press the CH1/2 select button as often till you hear the desired audio channel. The selected audio channel is displayed on the VTR. During bilingual broadcasts CH1 is the main language and CH2 is the foreign language.



### Index signal

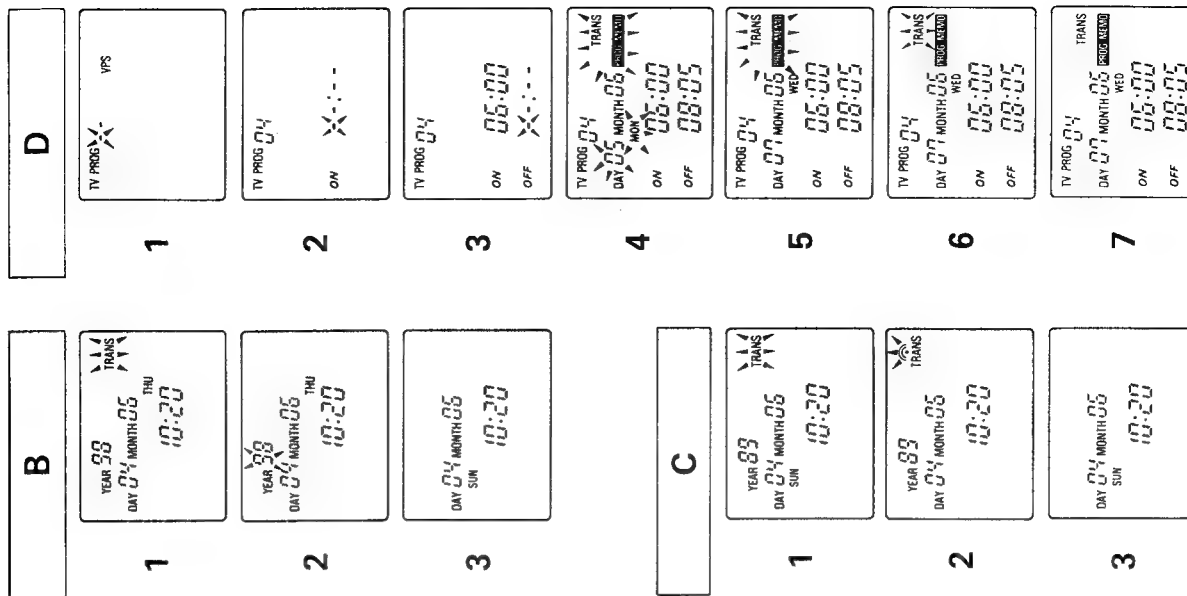
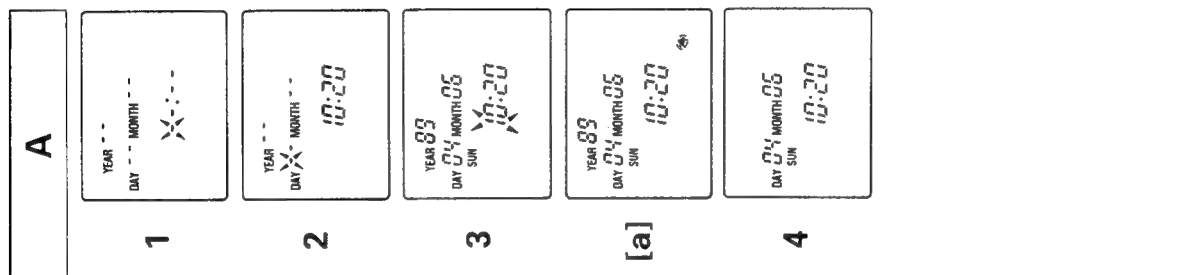
This VTR will automatically record the index signals on a tape at the beginnings of each programme every time the REC button is pressed.

Normally, an index "mark" is not recorded if PAUSE is pressed and released during recording. You must press the REC button. If you are recording two programmes — one immediately following the other — you must press STOP and then REC to insert an index "mark". If you are making an Audio only tape (no video), the VTR will put index marks on the tape when you release REC/PAUSE.

These indexed marks are useful for "Tape Indexing".

### Notes:

1. It is necessary for recordings to be two minutes or longer for the Tape Indexing features to operate correctly. In audio-only recording, it is also necessary to record for four minutes or longer for these functions to operate correctly.
2. When recording is performed from the beginning of the tape, the index mark will not be detected. To prevent this, play back the tape for approx. 5 seconds before recording.



### Before setting the clock/calendar and programming the timer, remember following.

1. Insert two batteries (size IEC R6) in the battery compartment of remote control unit.
2. First set the clock/calendar, then timer if desired.
3. While you are setting/programming them, the display panel on the remote control unit will prompt you through the procedure.
4. Always press [0] before a single-digit hour, minute, day, month, and year.
5. If you press the wrong digit during setting/programming them, press the CORRECT button repeatedly until the incorrect digit flashes then enter the correct digit.
6. You have about one minute to do each step in the procedure. If you do not proceed to the next step within this time, all entries are erased and you must start over.

### TO SET CLOCK/CALENDAR

(See diagram [A])

- 1 Press CLOCK.
- 2 Set the time.  
For example, press [1][0][2][0] for 10:20.
- 3 Set the calendar.  
For example, press [0][4][0][6][8][9] for the 4th of June, 1989.

The day of week appears automatically.

**Note:** This remote control has an alarm function. Press the TV PROGRAMME (▼)/ALARM button so that alarm indicator (🔔) lights to operate the alarm function. See the alarm function below for details.

- 4 After setting the calendar, press CLOCK.  
The year disappears from the display panel and the clock starts counting.

**Note:** If you don't press CLOCK and leave it for about one minute, the display changes as above and the clock starts counting.

#### Alarm function

When the present time shown by the remote control unit and the start time of the programme stored in memory of the remote control match, the alarm function works and a buzzer sounds for about 5 seconds. This is convenient for you to check whether timer recording starts correctly or not. You can switch the alarm function on and off by pressing the TV PROGRAMME (▼)/ALARM button when you are setting or correcting the clock (when 1 - 3 of [A] and 1 - 2 of [B] are displayed). The alarm function is on when alarm indicator (🔔) is lit and off when it is off.



### TO PROGRAMME THE TIMER

(See diagram [D])

- 1 Press PROG.

**VPS indicator:** Used when using a VTR with the Video Programme System built in. VPS ON/OFF is activated by the TV PROGRAM (▲) button of the remote control unit.

- 2 Select the TV station number to be recorded.  
For example, press [0][4] for the TV station 4.

#### Notes:

- Press [9][1] when recording video and audio from external equipment.
- "AUX" appears in the display panel in place of a station number.
- When recording video from the VTR's tuner and audio from external equipment, press [9][0] to display "SC" and then input a station number.

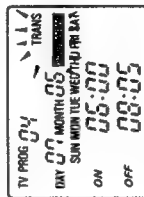
- 3 Select the start time.  
For example, press [0][6][0][0] for 6:00.

- 4 Select the stop time.  
For example, press [0][8][0][5] for 8:05.

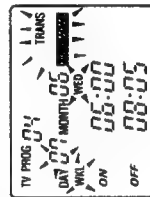
- 5 Select date for recording.

- To record on a single day up to one year ahead:  
For example, press [0][7][0][6] to begin recording on the 7th of June.

- To record at the same time every day of week:  
Press [7] WKL/DLY once to display all days. Then select the first recording date.



- To record on a specified day at the same time each week: Press [7] WKL/DLY repeatedly until the desired day of the week you want to record appears.



- 6 Now, programming has been completed for one event. Press PROG MEMO [M] to store this programme in the memory of the remote control. See "Storing programmes in the memory of remote control" on the next page for details.

- 7 After programming, press TRANS.

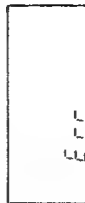
- If the VTR has the OSD function, the transferred details are displayed in the VTR display and on the TV screen.
- If the VTR has no OSD function, the transferred details are displayed in the VTR display.

- 8 Press CLOCK to switch the display panel on the remote control unit back to the clock/calendar display.

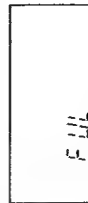
- 9 To activate the VTR's timer and make a recording at the preselected time, be sure to turn the system power off. Of course a cassette which has an intact safety tab must be inserted.

#### Operating notes

- 1 If you select a TV station which is not displayed if the TV PROG button on the VTR is pressed, "Err" is displayed by the VTR when the TRANS button is pressed. In this case, correct the channel then transfer them to VTR.



- 2 Check the display on the VTR before transferring data. If the TRANS button is pressed when all the programme numbers that the VTR can store are occupied, a "FUL" indication will appear in the display on the VTR and the information transferred will be rejected.



## Storing programmes in the memory of the remote control

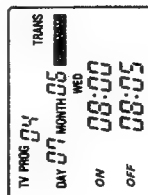
This remote control unit can store programmed information in its memory for up to 4 programmes. Press **PROG MEMO [M]** in step 6 to store the details of the programme being displayed on the remote control in its memory. When storing the programme in memory, **[PROG MEMO]** lights to inform you. If you store a programme in memory, you can check or correct it easily.

**Note:** If you attempt to store another programme after storing 4 programmes, **[PROG MEMO]** does not appear in step 4. If **PROG MEMO [M]** is pressed at this time, the indication below appears to inform you that the memory is full.

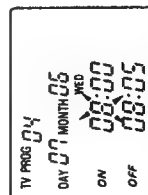


## Correcting a programme in memory of the remote control unit

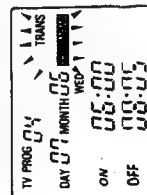
1. Press **PROG MEMO [M]** to display the incorrect programme.



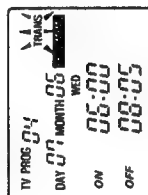
2. Press **CORRECT** repeatedly until the incorrect digit flashes.



3. Press buttons 0 - 9 to input the correct digit.  
4. After the correction, press **CORRECT** until "TRANS" and **[PROG MEMO]** flash.



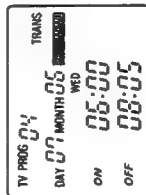
5. Press **PROG MEMO [M]** to store the programme.



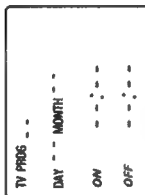
6. Press **TRANS** to transfer the programme to the VTR.  
**Note:** The previously stored incorrect programme is rewritten with the new programme. However, when the incorrect programme has already been transferred to the VTR, it is stored in the memory of the VTR. Clear the programme following "To clear a programme from the VTR's memory".

## Clearing a programme from memory of remote control unit

1. Press **PROG MEMO [M]** when the remote control is displaying the present time to display the programme to be cleared.



2. Press **COUNTER RESET** button.



The programme will be cleared.

**Note:** When a programme is cleared from the memory of the remote control, it is not cleared from the VTR's memory. To clear the programme from the VTR's memory, see "To clear a programme from the VTR's memory" on the next page.

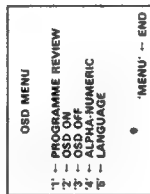
## To check programming in the memory of the VTR

There are two ways to check the details of a programme transferred from the remote control to the VTR.

• To check it in the VTR's display:  
Press the **MENU** button with the VTR turned off. Press the **MENU** button repeatedly to check all programmes. If you press the **OSD DISP** button, you can scan the details of stored programmes visually. The display will return to the clock after several seconds.

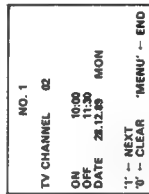
• To check it on the TV screen (if your VTR provides OSD function):

1. Turn the TV and VTR on.
2. Set the TV to the video channel (37).
3. Press the **MENU** button.
  - The menu will appear on the TV screen.



4. Press **[1]**.

- The programme will appear.
- Press **[1]** repeatedly to check all programmes.
- Each programme is displayed for approx. one minute.



5. Press the **MENU** button after checking programmes.

- The TV will return to a normal picture.
- If the **MENU** button is not pressed within one minute, the TV will return to a normal picture.

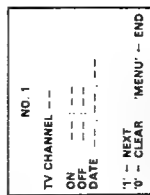
## To clear a programme from the VTR's memory

• To clear it while monitoring it in the VTR's display:

1. Display the programme to be cleared in the VTR's display. See "To check programming in the memory of the VTR" at left for the operation.
2. Press the **COUNTER RESET** button. The display returns to the clock time display and the cleared programme number disappears.
- To clear a programme while monitoring it on the TV screen (if your VTR provides OSD function):

1. Display the programme to be cleared on the TV screen. See "To check programming in the memory of the VTR" at left for the operation.

2. Press **[0]**.  
The programme is cleared and the picture changes to that shown below.



3. If you want to clear another programme, press **[1]** to display the programme to be cleared and then press **[0]**.

4. Press the **MENU** button when clearing is completed. The TV screen returns to a normal picture.
  - When the **CLEAR** button is not pressed within one minute, the TV screen returns to a normal picture.

## Programming errors

If programmes overlap, the VTR will select the programme with the earlier start time. When that programme is over, the VTR will switch to the next programme. If the start times are the same, the VTR will select the programmes in numerical order.

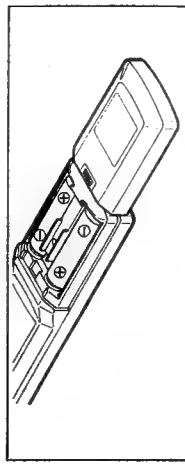
**Note:** If the display of the remote control is not correct, remove the batteries and leave the unit for about 30 seconds, then re-insert the batteries.

As the clock and timer programmes will be erased, re-set the clock and re-programme the timer.

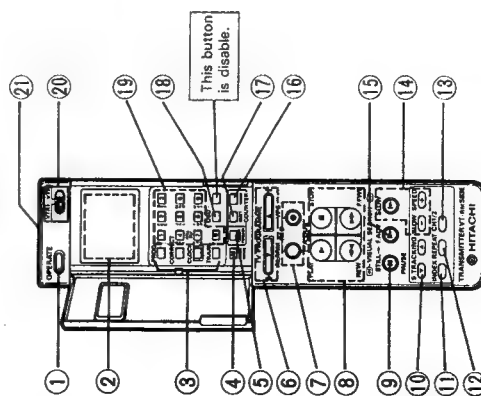
## REMOTE OPERATION

You can operate the VTR from a distance using the infrared remote control unit which performs the same functions as the corresponding buttons on the VTR.

**Power source of infrared remote control unit**  
The infrared remote control unit is powered by two batteries (size IEC standard R6). The life of the batteries is about a year although it depends on the number of times the unit is used. Replace the batteries when operation is not possible or when the distance becomes too small.



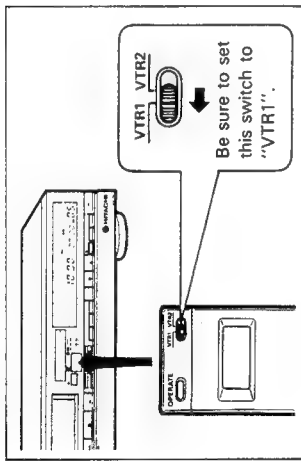
## Controls and function



- ① **OPERATE:** Same as OPERATE on the VTR (turns operate on/off).
- ② **Clock/time display:** While setting the clock/timer, this display will prompt you through the procedure. After setting the clock, the display shows the clock time.
- ③ **Clock/timer programme buttons:** See the supplementary manual for complete information.
- ④ **PROG MEMO:** Press to store the programmed contents in the memory of the remote unit after programming the timer. This can store up to 4 programmes. See the supplementary manual for complete information.
- ⑤ **COUNT/REMAIN:** Press to switch from a counter display to tape remaining display.

## Operation of remote control

To use the infrared remote control unit aim it at the receiver on the front panel of the VTR.



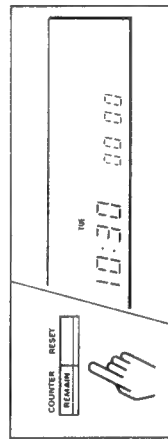
- ⑥ **TV PROGRAMME:** Same as CHANNEL on the VTR. (Selects the next higher or lower TV station.)
- ⑦ **REC:** Press both buttons to start recording.
- ⑧ **PLAY/STOP/REW/F.FWD:** Same as on the VTR.
- ⑨ **STILL/PAUSE:** Same as STILL/PAUSE on the VTR. (Stops the tape temporarily.)
- ⑩ **S-TRACKING:** Minimize noise in the picture during playback.
- ⑪ **INDEX:** Used for INDEX function.
- ⑫ **REPEAT:** For repeat function.
- ⑬ **CH1/2:** Select the desired audio channel while playing a tape.
- ⑭ **SLOW/SLOW SPEED:** Used for slow motion play.
- ⑮ **F.ADV:** Advance the picture from frame to frame during still playback.
- ⑯ **COUNTER MEMO:** Turns counter memory function on and off.
- ⑰ **COUNTER RESET:** Same as RESET on the VTR. (Resets the tape counter to "0000" or calculates the tape remaining for an E240 cassette.)
- ⑱ **OSD:** Controls the On-Screen Display.
- ⑲ **10-KEY button**
  - Press two numbers to select a TV station.
  - Also use for setting the clock and programming the timer.
- ⑳ **VTR1/VTR2:** Set this switch to "VTR1" to remotely control the VTR. The VTR2 position is disable.
- ㉑ **Transmission window:** Transmits commands to the VTR.

**Note:** The infrared rays will bounce off the walls and eventually reach the receiver on the VTR, but for best results transmit the rays directly to the receiver.

## SPECIAL CHARACTERISTICS

### Tape counter

This indicates the amount of video tape transported as a number. Press the COUNTER/REMAIN select button to display the tape counter in the display then press the RESET button to set the counter reading to "0000" when starting recording or playing back.

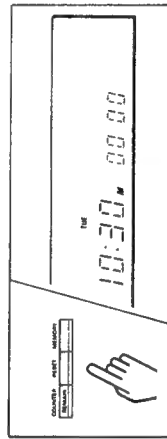


Note the number on the Tape counter at the beginning and end of each programme you record. This will allow you to use the counter to find the desired programme later.

### Counter memory function

This is useful if there is a section of tape you want to view immediately after recording or if you want to return to the same point several times.

1. Begin recording or playing back a tape.
2. Press the COUNTER/REMAIN select button to display the tape counter in the display.
3. At the point where you want playback to begin, reset the tape counter to "0000" by pressing the RESET button.
4. Press MEMORY button, and the "M" appears in the display.



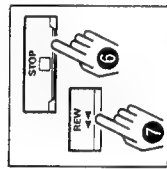
5. Continue to play or record.

6. Press the STOP button when recording or playback finishes.

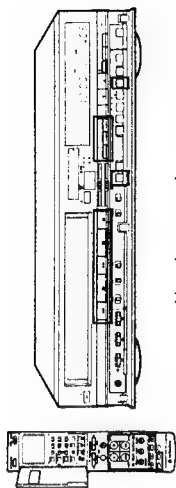
7. Press the REW button.

The tape will automatically stop at the pre-selected "0000" position.

Actually, so that you won't miss the very first part of the programme to be viewed, the tape will stop slightly prior to "0000" at approximately the "9997" position.



## User's controls

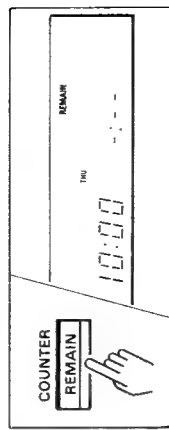


**Note:** The counter memory function will also operate during the fast-forwarding mode.

### Tape remaining

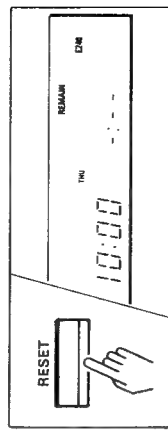
This function allows the remaining tape to be displayed as a time during recording or playback.

1. Press the COUNTER/REMAIN select button. The "REMAIN" indicator lights in the display and the counter display is replaced with the tape remaining display.

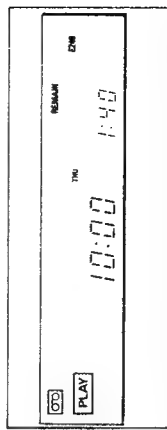


2. Press the RESET button and display the E240 indicator in the display only when the cassette E240 is used.

**Note:** Set the RESET button correctly matching the tape used. When the setting position is wrong, the remaining time is not displayed correctly.



3. Start recording or playback. After approx. 15 seconds, the remaining time appears in the display.



**Note:** Use the tape remaining display as a reference. The tape remaining function is designed so it works correctly with E-30, E-60, E-120, E-180 and E-240 cassettes. If you use a cassette other than these, the tape remaining will not be displayed correctly.

### Still playback

Press the PAUSE button to stop the picture on the screen during playback. During still playback, press the PAUSE button to return to normal playback or the STOP button to stop the tape.

### Notes:

- If you see vertical shaking on the TV screen in still playback mode, rotate the V LOCK controls on the rear panel to minimize shaking. (SP for tapes recorded in SP and LP for tapes recorded in LP.)
- When the still playback mode continues for about 5 minutes, the VTR switches to the stop mode automatically to prevent damage to the tape.
- The playback picture will have some noise in the still playback mode.

### Frame advance

When you hold F.ADV button on the remote control unit down during still playback mode, tape will be played back frame by frame. It operates only after PAUSE button has been pressed.

### Visual search

This allows you to view the played back picture at high speed in both the forward and reverse directions.

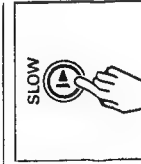
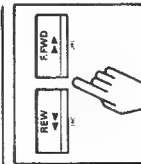
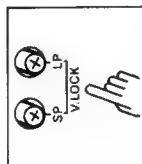
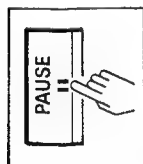
Press either the REW or F.FWD button during playback, then release it. Pictures can be viewed at high speed in either the forward or reverse direction. Press the PLAY button to return to normal playback or press the STOP button to stop tape. Press and hold the REW or F.FWD button in the visual search mode. Pictures can be viewed at higher speed than in normal visual search. Release the button to return to the normal visual search.

**Note:** The playback picture will have some noise in the visual search mode.

### Slow function

Press SLOW button on the remote control during playback, and the tape is played back at slow speed.

Then use the SLOW SPEED buttons on the remote control unit to vary the playback speed.



### Notes:

- When noise appears in the slow playback pictures, it can be removed by pressing the S.TRACKING buttons on the remote control unit. Removing the noise in the slow playback also lets you enjoy a noise-free picture in still playback.
- When the slow playback mode continues for about 5 minutes, the VTR switches to the play mode automatically.

### Repeat function

Use this function to repeat the scene you have just viewed during playback.

1 During playback, press PLAY button at the scene where you want the repeat of the playback to start. The playback continues.

2 Press REPEAT button on the remote control unit. The VTR enters into the reverse search mode then enters into the playback mode at the position where the PLAY button was pressed.

### Auto endless play

Press the PLAY and STORE buttons simultaneously; you can play the tape from the beginning to the end repeatedly. To stop endless play, press the EJECT or OPERATE button.

**Note:** If the counter memory function is turned on, the VTR stops rewinding at "0000" then start playback.

### Automatic rewind

The VTR automatically rewinds the tape when the end of the tape is reached.

### Rewind shut off

If OPERATE switch is pressed during rewind operation, power will be turned off automatically after the tape has been completely rewound.

**Note:** If the counter memory is turned on, the VTR will stop rewinding and switch off at 0000.

### Beep sound

This VTR has a BUZZER switch on the rear panel. When this switch is ON, a beep sound will be heard when any VTR operation button is pressed. This is a convenience in operation.

To stop the beep sound, set the switch to OFF.

## OSD OPERATION

The OSD function allows you to display some functions of this VTR on the TV screen so that you can operate them easily and select the required function using the remote control.

### Programme review

This function is very convenient when you want to check the contents of programmes stored in the VTR.

- Press the OSD button.
- Press button [1].



- The contents of programme numbers 1 through 4 will appear.



- Press the button "▲" (CHANNEL ▲) to display the contents of programme numbers 5 through 8.



- The contents of programme numbers 5 through 8 will appear.

- Press the button "▲" (CHANNEL ▲) if you want to return the screen to the contents of programme numbers 1 through 4.

- Press the OSD button to return the TV screen to normal. The menu display will automatically return to normal if nothing is done for about 1 minute.

### Calendar

This function accesses the built-in calendar which can display every month from January, 0001 to December, 9999.



- Press the OSD button.
- Press button [2].

- The programmable calendar menu will appear.



- Set the month and year by inputting 6 digits.

For example, press [0] [1] [9] [9] [0] [1] for January, 1990.

- If the incorrect digit is input, press the button "←" (CHANNEL ←) to position the flashing cursor over the digit to be corrected, then input the correct digit.

Always press [0] before a single digit month.

- The calendar for the month you have input will appear.



- Press the button "→" (CHANNEL →) to display the calendar of next month or press the button "←" (CHANNEL ←) to display the calendar of the previous month.

- Press button [0] to return the display to the programmable calendar menu shown in step 3. Then repeat step 4 above.

- Press the OSD button to return the TV screen to normal. The menu display will automatically return to normal if nothing is done for about 1 minute.

### Title making

You can create and record titles on a pre-recorded tape.

1. Press the OSD button.



2. Press button [6].

3. The programmable title display will appear on the TV screen along with a flashing block.



4. Select the first character position by pressing the button "↑" (CHANNEL ▲) or the "↓" (CHANNEL ▼).

5. Press one of numbered buttons [0] through [9].

The letters shown in the table on the right are selected using numbered buttons.

6. When the desired character is input, shift the flashing block to the position to be programmed next. Then repeat steps 5 and 6 until the desired title is completed.

7. After completing the desired title, do not shift the flashing block, or the flashing block will be recorded on tape when recording starts.

8. To record this title:

a. Press PLAY to start playback.  
b. At the point where you want to stop title recording, reset the tape counter to "0000" by pressing COUNTER RESET. Then press COUNTER MEMO to display "M" in the tape counter.

c. Press REW. The VTR will enter the visual search mode.

d. Press PLAY then PAUSE at the point where you want to start title recording. The VTR will enter the still play mode.

e. Press REC.

The VTR will enter the record/pause mode.

f. Press the SLOW SPEED button (+) to select whether you will record the title superimposing it on a previously recorded picture or record it against a blue background.

g. Press PAUSE.

Now, title recording starts.

h. Title recording will stop where the tape counter reaches to "0000".

### Notes:

- To correct errors during programming press the button "↑" (CHANNEL ▼) or "↓" (CHANNEL ▲) to position the flashing block over the character to be corrected.
- If the button is kept depressed, the flashing block will shift rapidly. Then input the correct digit.
- These titles cannot be recorded on a non-recorded portion of tape.

- When you play back a tape on which a title was recorded against a blue background in the visual search and still modes, colour will disappear and skew noise will occur.
- Do not transfer the time from the remote control while recording a title. If you transfer it, the title function will be released.

### Character assignment

Following letters are selected by pressing buttons [0] through [9].

[0]	0	?	!	,		[5]	5	J	K	L
[1]	1	Q	Z	,		[6]	6	M	N	O
[2]	2	A	B	C		[7]	7	P	R	S
[3]	3	D	E	F		[8]	8	T	U	V
[4]	4	G	H	I		[9]	9	W	X	Y

### Character size and capacity

You have a choice of three character sizes: medium, large and extra large when making titles.

Press the S.TRACKING button (▲) repeatedly until the desired size appears on the TV screen. The programmable capacity using each size is as follows:

MEDIUM: 240 characters along 10 lines with 24 characters per line.

LARGE: 144 characters along 6 lines with 24 characters per line.

EXTRA LARGE: 96 characters along 4 lines with 24 characters per line.

### OSD on and OSD off

Whenever you turn on the VTR or change its status — Stop to Play, Play to Stop, change channels, etc. — the new status of the VTR is displayed on the TV screen automatically for a few seconds. You can remove all displays from the screen when they are not needed.

1. Press the OSD button.

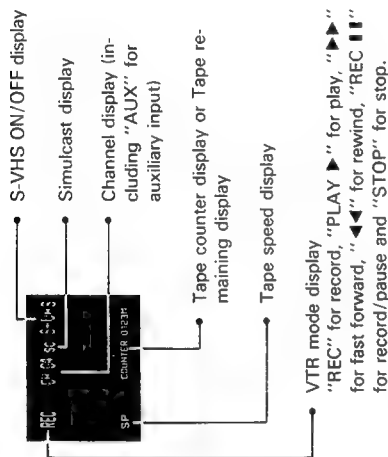


2. Press button [3] to turn the OSD feature on and off.

- "OSD OFF" will appear on the screen for a few seconds when you select OSD OFF.
- If you select OSD ON, the VTR status will appear for a few seconds.

Note: This VTR has been shipped from the factory with "OSD ON".

### Contents of display



### Tape indexing

Tape indexing allows you to search the required programmes easily using INDEX signals that are recorded automatically each time a recording is started. These are two methods of indexing.

One is a Random Access Indexing.

This is the direct recall of the desired programme by inputting a programme number which can be listed on a label stuck on your video cassette.

The other is Scana Indexing in which the first few seconds of all recordings can be viewed during searching. This also allows you to jot down all recording on the tape easily.

### Random Access Indexing

1. Press the INDEX button during the stop mode. The index menu will appear.



2. Press two buttons of the 10-key pad to select the desired programme number.

Note: Up to a maximum number of 99 programmes can be selected.

3. Press the PLAY button (▶).

You may press the REW or F.FWD button instead of play.

4. The VTR will automatically search for the programme you selected.

During search, the selected index number and the direction of searching is displayed on the TV screen.

5. When the programme you selected is located, the VTR will automatically begin play and the INDEX indicator on the VTR will be turned off.



### Notes:

- If this is the first time you have used Tape Indexing since the cassette was inserted, the VTR rewinds the tape to the beginning to start counting index marks. If this is not the first time Tape Indexing is used, the VTR can count the index marks without returning to the beginning.
- To use Tape Indexing, the tape must have been recorded by a VTR with the INDEX feature.

### Scana Indexing

1. Press the INDEX button during the stop mode. The index menu will appear.



2. Press the REW or F.FWD button. The tape will be rewound or fast forwarded until an index mark is detected.



3. When the VTR has located an index mark, it will enter the forward search mode for approximately 10 seconds of the programme following the mark. This is long enough for you to recognize the programme. Then the VTR winds tape to the next index mark in sequence.

Note: With an audio-only tape, every time an INDEX signal is reached, the tape will be played for 10 seconds.

4. When you see the programme you want to watch, press the PLAY button.

The INDEX indicator on the VTR will be turned off.



## TIMER RECORDING

The programmable electronic clock/timer permits the unattended recording of 8 preselected programmes within a period of 1 year, including the same programme(s) repeated on every day and the same programme(s) every week. It turns the unit on and off and selects the channel automatically.

The timer can also be programmed with the remote control unit provided. See the supplementary manual for more details on programming procedures with the remote control unit.

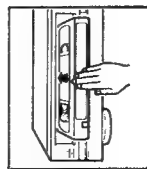
### Preparations for timer recording

- Your TV does not have to be on to make a recording because the VTR records TV programmes without the aid of your TV. Its only use is for monitoring.

1 Make sure that the clock shows the present time and day correctly.

2 Insert a cassette.

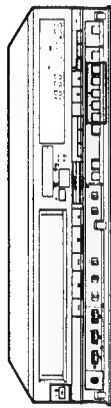
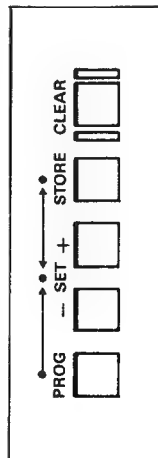
Be sure to check that the record safety tab is not missing. If the record safety tab is missing, recording will not begin.



3 Programme the timer.

**Programming the timer for unattended recording**  
For unattended recording the timer needs to know what day to make the recording, the time to start, the time to stop, and the channel to be recorded.

The buttons for programming the timer are in the secondary control door: PROGRAM, SET and STORE buttons. If you input erroneous information by mistake when programming the timer, press the CLEAR button and input the correct information again.



User's controls

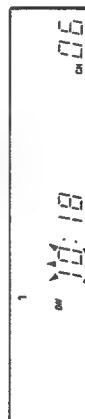
1 Press the PROGRAMME button.



An unused programme number is automatically selected from numbers 1 to 8 in numerical order and the channel number will start flashing.

**NOTE:** Check the programme numbers in the display before pressing the PROGRAMME button. The timer allows up to 8 programmes to be stored, but when all programme numbers 1 to 8 are lit in the display, no programming can be performed. To input a programme at this time, clear one of the 8 programme numbers (see "To clear a programme"). When the PROGRAMME button is pressed while all the 8 programme numbers are lit, the "FUL" indicator will light to warn you. (When the BUZZER switch is ON in this state, a beep sound will be heard to warn you.)

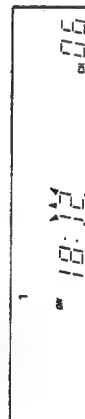
2 Choose the channel to be recorded by pressing the SET or CHANNEL select button. Then press the STORE button. Hour starts flashing.



For example, the above diagram shows that channel 6 has been set.

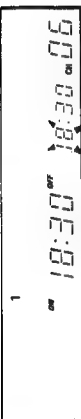
3 Select the hour for recording to start by pressing the SET button (Forward or Reverse). Hold down the button to advance it rapidly.

Press the STORE button after selecting the hour for recording to start. Minute starts flashing.



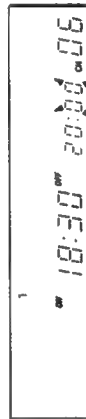
For example, the above diagram shows that "18" hours has been set.

4 Select the minutes for recording to start by pressing the SET button (Forward or Reverse). Hold down the button to advance it rapidly. Press the STORE button after selecting the minute for recording to start. "OFF" will appear and hour starts flashing.



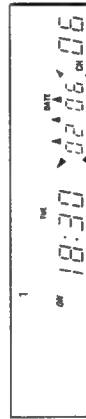
For example, the above diagram shows that "30" minutes has been set.

5 Select the hour and minute to stop recording by the same procedures described in steps 3 and 4.

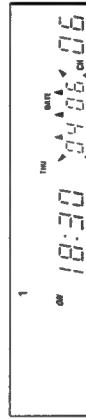


For example, the above diagram shows that "20:00" has been set.

Be sure to press the STORE button after selecting the minute. The current date appears and starts flashing.



6 Press the Forward SET (+) button to select the day and month of recording.

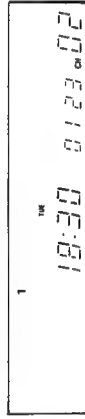


For example, the above diagram shows recording on the 4th of June.

**Notes:**

- Day of week appears automatically.
- If you want to start recording on the current day, simply press the STORE button.
- The above diagram shows how to record a programme on a single day. To record a programme at the same time on every day or to record it on one certain day of each week, follow the procedure described below.

After setting the day and month press the STORE button. The programme indicator flashes and the display shows both start and stop times in a few seconds. Then display shows start time and date. Finally the display returns to normal together with lighting programme number.



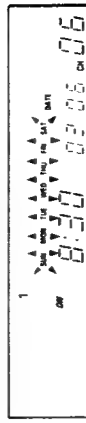
### NOTES:

To record a programme at the same time every day of week or to record a programme on a specified day at the same time each week, perform the following step instead of step 6 above.

To record at the same time every day of the week

Press the Reverse SET (-) button once. All day indicators light.

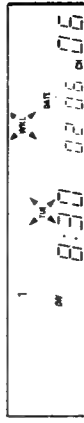
If you press the button twice or more, press the button until all day indicators light. Hold down the button to advance rapidly.



Then press the STORE button.

To record at the same time on a specified day each week

Press the Reverse SET (-) button until the desired day indicator lights along with letters "WKL". Hold down the button to advance it rapidly.



Then press the STORE button.

Now, one programme has been completed.

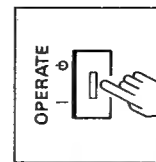
7 Turn off the OPERATE switch. The "O" indicator will come on.

**Notes:**

- If the erase prevention tab is removed, the cassette is ejected automatically and "O" indicator will flash. Stick a piece of cellophane tape over the erase prevention hole on the cassette to enable recording.
- The "O" indicator will flash, if a cassette is not inserted.

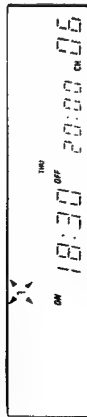
To stop timer recording

Press the OPERATE switch and then press the STOP button within 8 seconds.



### To clear a programme

- 1 Press the Forward SET button (+) until a programme number (and start/stop times) to be cleared appears.



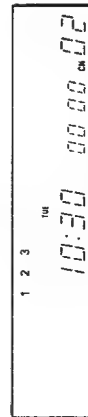
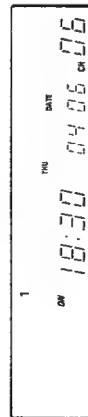
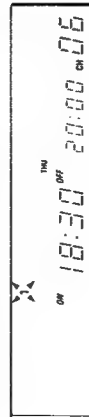
### 2

- Press the CLEAR button.
- The display returns to the clock time display and the cleared programme number disappears.
- Be sure to press the CLEAR button while the display shows the start/stop times or start time/start date. The programming does not clear if the CLEAR button is pressed after the display has returned to the clock time display.

### To check programming

Press the Forward SET button (+).

The programme indicator "1" flashes. If the programme No. 1 has been already programmed, both start and stop times are displayed. After a few seconds the display shows start time and start date. The display then automatically returns to the present time of day. When the clock display reappears, press the Forward SET button (+) again to check the next programme. If that programme number has not been used, only programme number will appear.



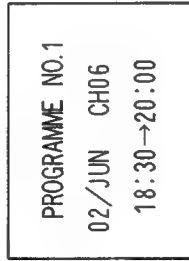
### Programming errors

If programmes overlap, the VTR will select the programme with the earlier start time. When that programme is over, the VTR will switch to the next programme. If the start times are the same, the VTR will select the programmes in numerical order.

**NOTE:** If a power failure occurs, the programmed information will be maintained. However, if the power failure continues for 15 minutes or longer, the present time will be erased.

Set the clock correctly.

**NOTE:** When the information programmed by operating the remote control unit provided is transferred to the VTR, the programmed information is displayed on the TV screen for about 8 seconds.



## VPS (Video Programme System) FUNCTION [For VT-S85E(VPS)]

This VTR incorporates the VPS function.

If the VTR is tuned to a TV station transmitting a VPS signal, the VTR automatically takes any delay, earliness or extension of the programme into account and can record the specified programme.

For example, assume that you programme the timer for a football game on channel 8 from 19:00 to 20:45 on Saturday and the football game which is broadcast is changed to 21:00 to 23:00, the VPS function works and the VTR records the football game automatically from 21:00 to 23:00.

When the VTR is tuned to a station transmitting a VPS signal, "VPS" automatically appears in the display of the VTR.

Programming the timer for unattended recording automatically turns on the VPS function.

### NOTES:

1. To switch off the VPS function, press the VPS OFF switch once during programming of the timer so the "VPS" display disappears.  
Pressing the switch again turns VPS on.
- Use the UP CHANNEL button on the remote control unit when programming the timer using the remote control unit.

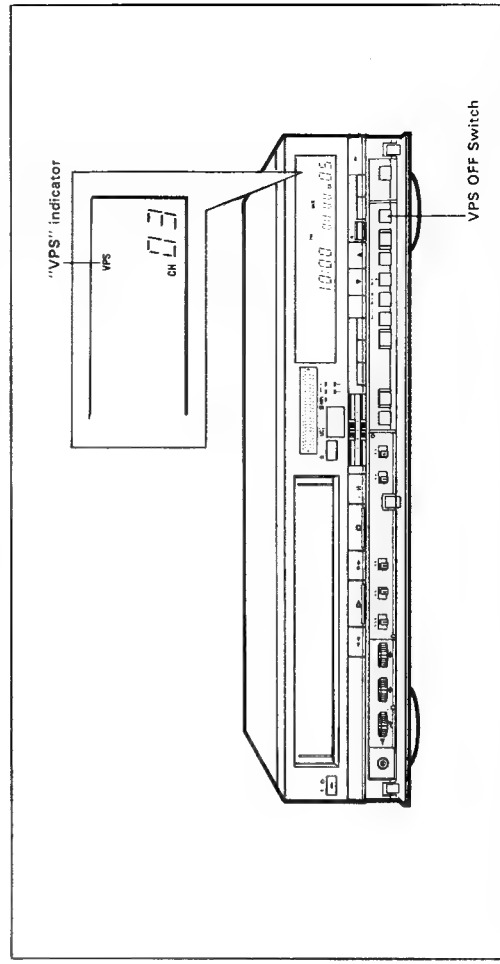
2. Always programme the timer for one TV programme to record the programme with the VPS function turned on. If you programme the timer for a football game and a movie on channel 3 sequentially from 10:00 to 14:00 for example, only the football game will be recorded but the movie will not.

In this case, programme the timer with the VPS off or input the other programme using another programme number to turn the VPS function on again.

3. When the VTR is tuned to a station transmitting a VPS signal but the signal conditions are poor, "VPS" will flash in the display.

In this case, programme the timer with VPS turned off. If you programme the timer with VPS turned on, the VPS function does not operate normally.

4. This function can also be used during ordinary recording as an auto stop function. When the VTR is recording a TV programme transmitting the VPS signal, the VPS indicator will light automatically; press the VPS OFF button at this time. The VPS indicator will change to flashing. When the TV programme ends, the recording will stop automatically and the VTR will enter the stop mode.



## DISASSEMBLY

## 1. IDENTIFICATIONS AND LOCATIONS OF CIRCUIT BOARDS

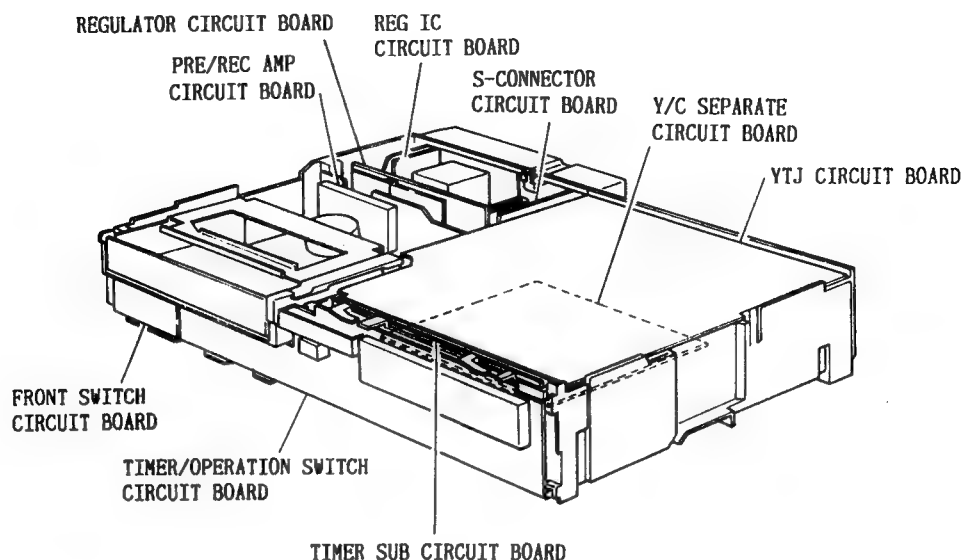


Fig. 1-1 Top View

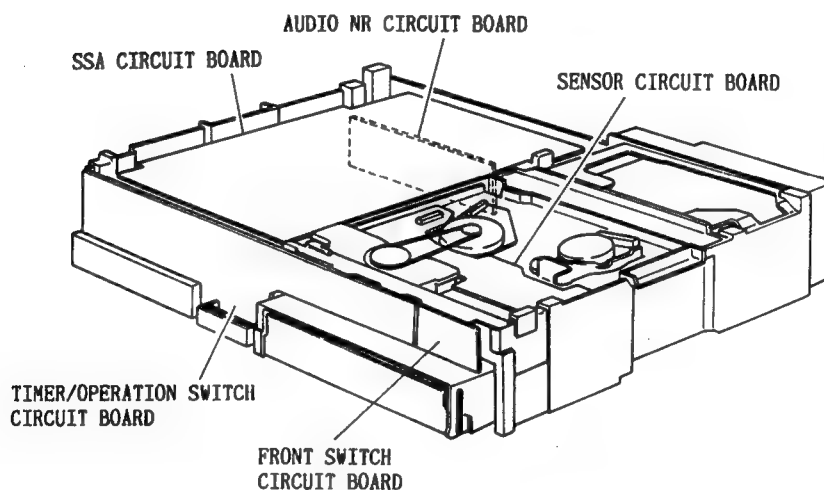
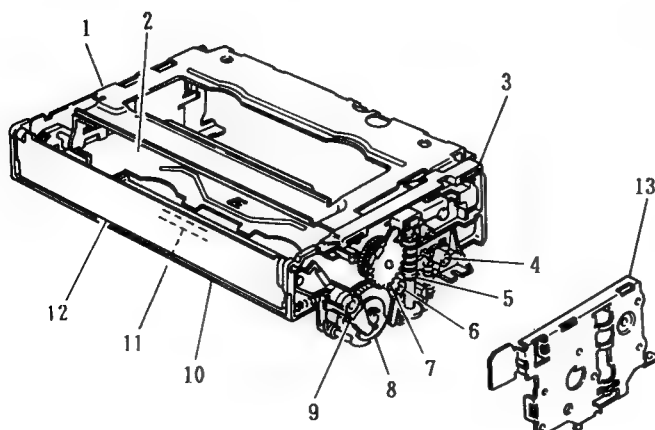


Fig. 1-2 Bottom View

## 2. IDENTIFICATIONS AND LOCATIONS OF MAIN MECHANICAL COMPONENTS



1. CHASSIS HOLDER
2. CASSETTE HOLDER
3. GEAR BRACKET
4. SWITCH LEVER B
5. FL WORM GEAR
6. SWITCH LEVER A
7. WORM WHEEL
8. DRIVE GEAR
9. DOOR ARM
10. FRONT HOLDER
11. SHAFT PIN
12. CASSETTE DOOR
13. SIDE CHASSIS

Fig. 2-1 Cassette Loading Mechanism

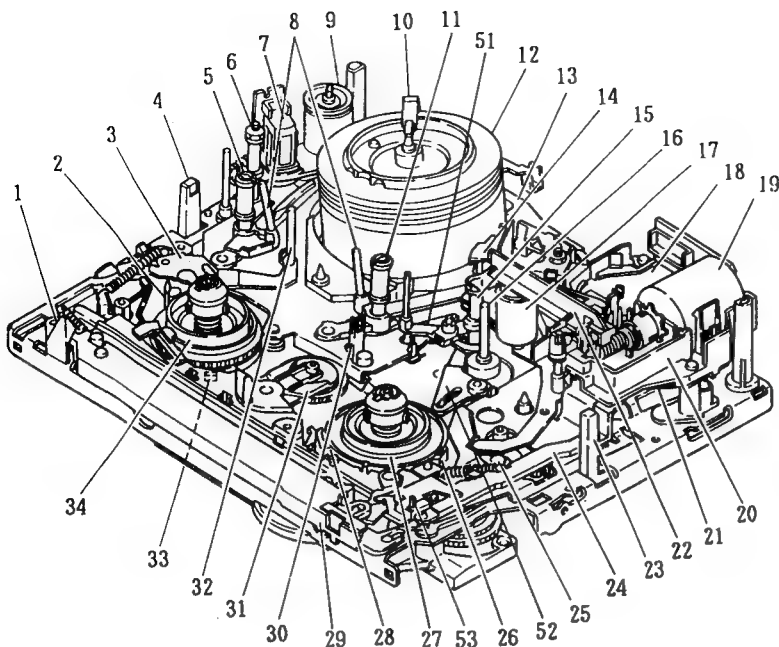


Fig. 2-2 Top View of Mechanism

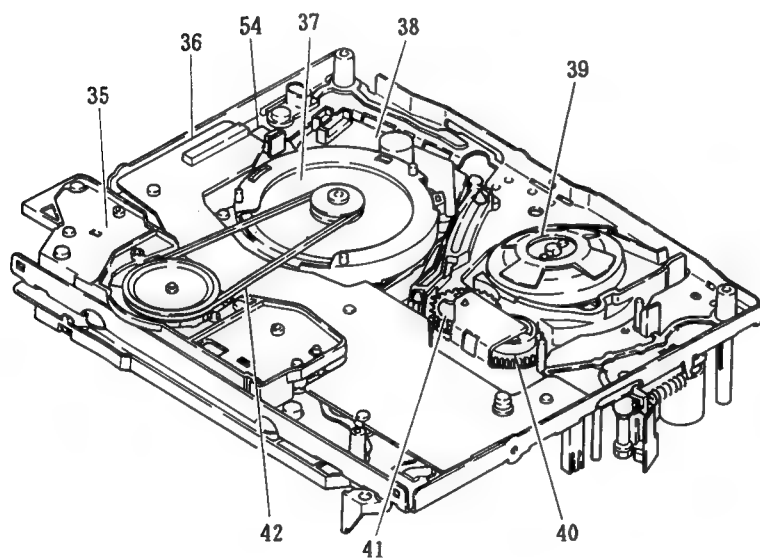


Fig. 2-3 Bottom View of Mechanism

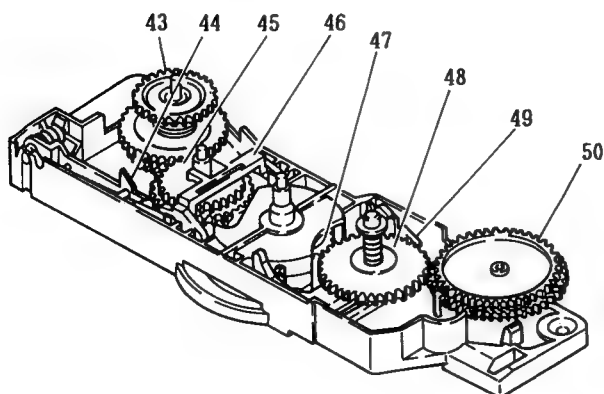


Fig. 2-4 Clutch Base

1. SAFETY ARM
2. TENSION BAND ASSEMBLY
3. TENSION ARM
4. SUPPLY REEL SENSOR
5. SUPPLY GUIDE ROLLER
6. SUPPLY GUIDE POLE
7. FULL ERASE HEAD
8. ANGLE POSTS
9. IMPEDANCE ROLLER
10. STATIC DISCHARGE BRUSH
11. TAKE-UP GUIDE ROLLER
12. CYLINDER MOTOR ASSEMBLY
13. CYLINDER BASE
14. AUDIO/CONTROL (A/C) HEAD
15. TAKE-UP POLE
16. CAPSTAN SHAFT
17. PRESSURE ROLLER ASSEMBLY
18. MECHANISM STATE SWITCH
19. LOADING MOTOR ASSEMBLY
20. LOADING MOTOR HOLDER
21. LOAD BRACKET
22. CASSETTE LID OPENER
23. TAKE-UP REEL SENSOR
24. BRAKE LINK ARM
25. PRESSURE ROLLER OPERATION ARM
26. TAKE-UP BRAKE ASSEMBLY
27. TAKE-UP REEL DISK
28. TAKE-UP MAIN BRAKE
29. SLIDER BLOCK ASSEMBLY
30. END LAMP
31. REEL DRIVE IDLER
32. TENSION POLE
33. SUPPLY MAIN BRAKE
34. SUPPLY REEL DISK
35. CLUTCH BASE ASSEMBLY
36. SENSOR P.C.B
37. CAPSTAN MOTOR
38. CAPSTAN MOTOR P.C.B
39. CYLINDER MOTOR ASSEMBLY
40. SUPPLY LOADING GEAR
41. TAKE-UP LOADING GEAR
42. REEL BELT
43. TAKE-UP GEAR
44. CLUTCH ARM
45. CHANGE GEAR
46. CHANGE ARM
47. TAKE-UP PULEY
48. FL CHANGE GEAR
49. FL CHANGE ARM
50. RELAY GEAR
51. HALF LOADING ARM
52. RELAY ARM
53. S-VHS SWITCH
54. POWER TR P.C.B

### 3. CASE REMOVAL

1. Preset Door
2. Top Cover
3. Bottom Cover
4. Front Panel
5. Rear Panel
6. Remote Controller

The numbers in parantheses in the illustrations show the order of removal.

#### 1. Preset Door (Fig. 3-1)

- 1) Open the preset door and, while depressing the attachment sections, pull the door in the direction of the arrows.

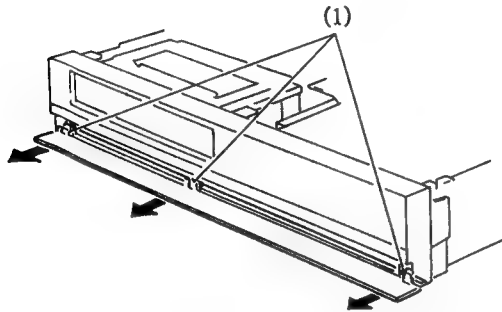


Fig. 3-1 Preset Door

#### 2. Top Cover (Fig. 3-2)

- 1) Remove five (5) screws.
- 2) Lift up the rear of the top cover and slide the entire cover backwards.

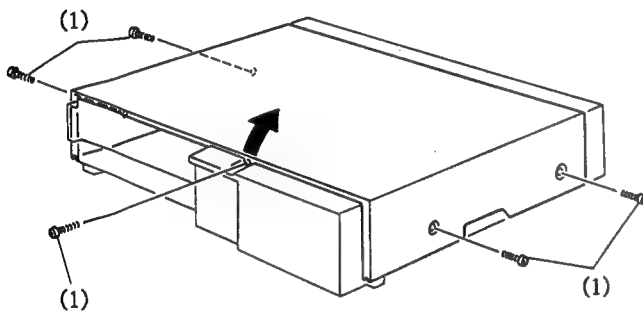


Fig. 3-2 Top Cover

#### 3. Bottom Cover (Fig. 3-3)

- 1) Remove three (3) screws to take out the bottom supports on the left and right.
- 2) Remove five (5) screws. Lift up the rear of the bottom cover.

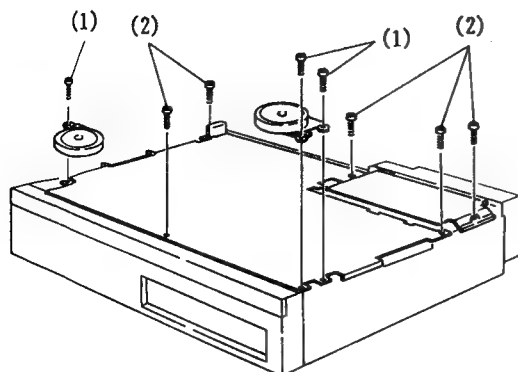


Fig. 3-3 Bottom Cover

#### 4. Front Panel (Fig. 3-4)

- 1) Remove the preset door and the top and bottom covers. (See items 1,2 and 3)
- 2) Release eight (8) stoppers.
- 3) Pull out the bottom of the front panel and remove the entire panel.

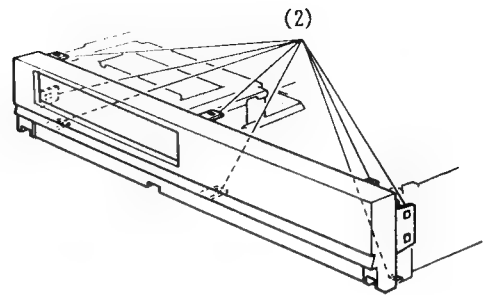


Fig. 3-4 Front Panel

#### 5. Rear Panel (Fig. 3-5)

- 1) Remove the top cover. (See item 2)
- 2) Open the YTI circuit board. (See item 3 in the section on circuit board removal)
- 3) Remove two (2) nylon rivets.
- 4) Remove one (1) screw holding the video jacks and remove two (2) screws holding the EURO connector.
- 5) Remove two (2) screws holding the rear panel.
- 6) Release one (1) stopper holding the RF converter and pull out the rear panel backwards.

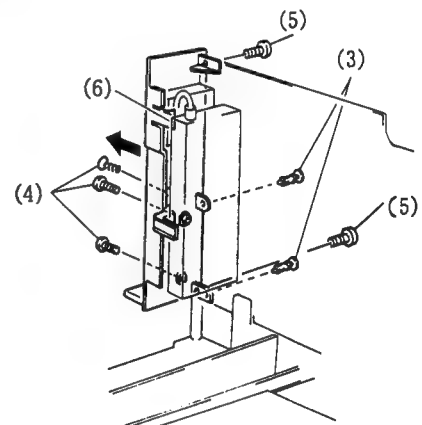


Fig. 3-5 Rear Panel

#### 6. Remote Controller (Fig. 3-6)

- 1) Remove the battery compartment.
- 2) Remove one (1) screw inside the battery compartment.
- 3) Release eight (8) tabs.

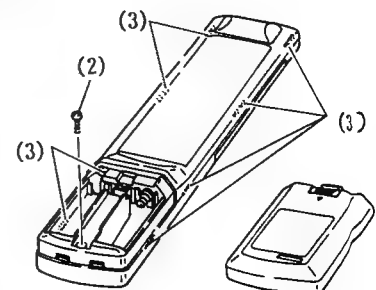


Fig. 3-6 Remote Controller

#### 4. CIRCUIT BOARD REMOVAL

1. Timer/Operation Switch Circuit Boards
2. Timer Sub Circuit Board
3. YTJ Circuit Board
4. SSA Circuit Board
5. Audio NR Circuit Board
6. Regulator Circuit Board
7. Pre/Rec Amp Circuit Board
8. S-Connector Circuit Board
9. Y/C Separate Circuit Board
10. Sensor Circuit Board

##### 1. Timer/Operation Switch, Front Switch Circuit Boards (Fig. 4-1)

- 1) Remove the top, bottom covers and front panel.  
(See items 2 to 4 in the section on case removal)
- 2) Release eight (8) stoppers and remove the block containing the timer and timer sub circuit boards.
- 3) Disconnect six (6) flat cables from the timer sub circuit board.
- 4) Release three (3) stoppers holding the circuit board holder.
- 5) Remove one screw (1) holding the ground wire.

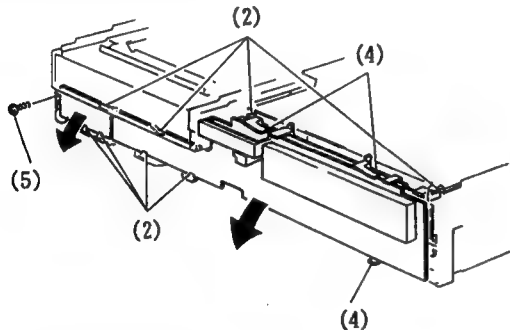


Fig. 4-1 Timer/Operation Switch, Front Switch Circuit Boards

##### 2. Timer Sub Circuit Board (Fig. 4-2)

- 1) Remove the top and bottom covers, front panel, preset door and the rear panel.  
(See items 1 to 5 in the section on case removal)
- 2) Remove the block containing the timer and timer sub circuit boards. (See item 1)
- 3) Disconnect six (6) flat cables and seven (7) connectors from the timer sub circuit board.
- 4) Release two (2) stoppers holding the circuit board holder and tilt the top of the timer sub circuit board to remove it.

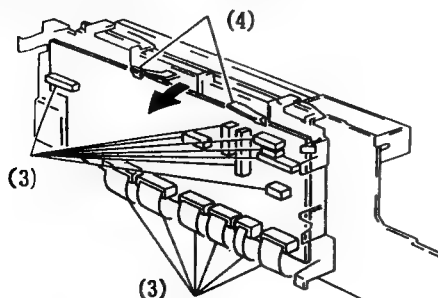


Fig. 4-2 Timer Sub Circuit Board

##### 3. YTJ Circuit Board (figs. 4-3, 4-4)

- 1) Remove the top cover. (See item 2 in the section on case removal)
- 2) Remove two (2) screws.
- 3) Release four (4) stoppers and open the YTJ circuit board in the direction of the arrow.
- 4) Disconnect seventeen (17) connectors and one (1) flat cable.

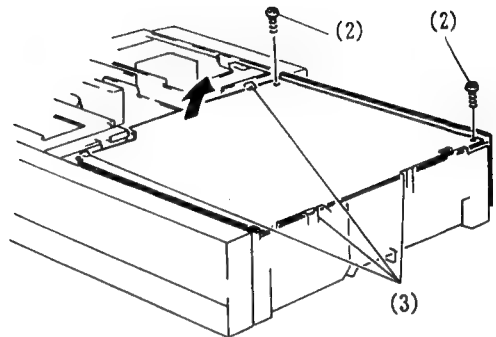


Fig. 4-3 YTJ Circuit Board(I)

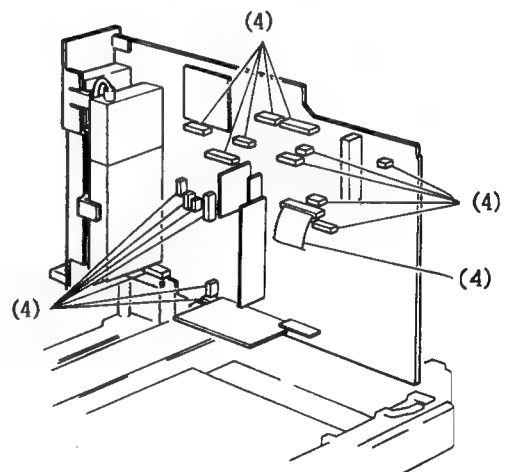


Fig. 4-4 YTJ Circuit Board(II)

##### 4. SSA Circuit Board (Figs. 4-5, 4-6)

- 1) Remove the top and bottom covers. (See items 2 and 3 in the section on case removal)
- 2) Remove one (1) screw.
- 3) Release four (4) stoppers holding the circuit board and open the circuit board in the direction of the arrow.
- 4) Disconnect the connector from the YTJ circuit board.
- 5) Disconnect seventeen (17) connectors.
- 6) Disconnect one flat cable.



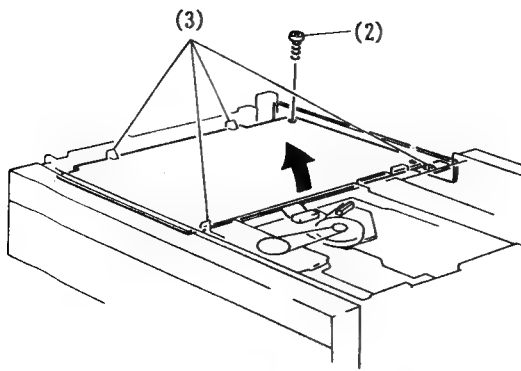


Fig. 4-5 SSA Circuit Board(I)

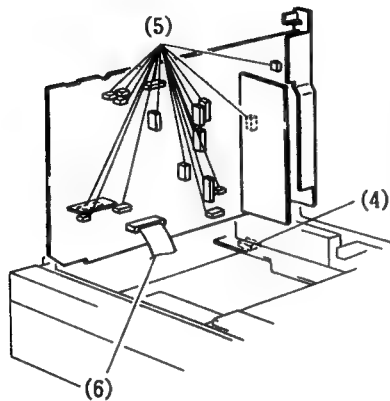


Fig. 4-6 SSA Circuit Board(II)

#### 5. Audio NR Circuit Board (Fig. 4-7)

- 1) Remove the bottom cover. (See item 3 in the section on case removal)
- 2) Open the SSA circuit board. (See item 4)
- 3) Pull out the audio NR circuit board in the direction of the arrow.

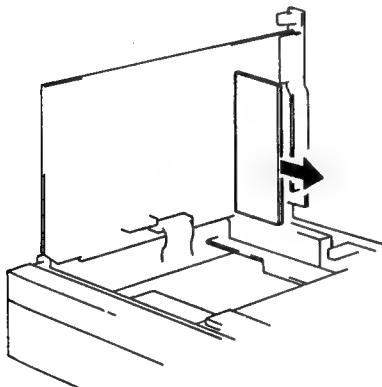


Fig. 4-7 Audio NR Circuit Board

#### 6. Regulator Circuit Board (Figs. 4-8 to 4-10)

- 1) Remove the top cover. (See item 2 in the section on case removal)
- 2) Remove one (1) screw holding the bottom cover.
- 3) Release two (2) stoppers to remove the rear piece.
- 4) Remove three (3) screws and lift up the regulator circuit block to pull it out.
- 5) Disconnect four (4) connectors from the regulator circuit board.

- 6) Remove two (2) regulator IC retaining screws.
- 7) Remove four (4) screws holding the power transformer.
- 8) Remove one (1) screw holding the regulator circuit board and remove the circuit board and power transformer from the regulator holder.
- 9) Release three (3) P.C.B supports and open the regulator circuit board in the direction of the arrow for servicing.

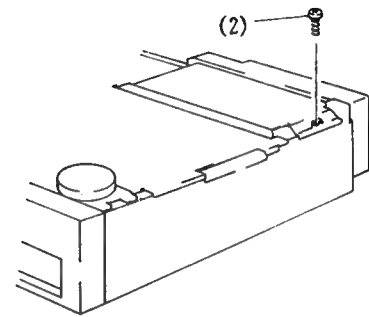


Fig. 4-8 Regulator Circuit Block(I)

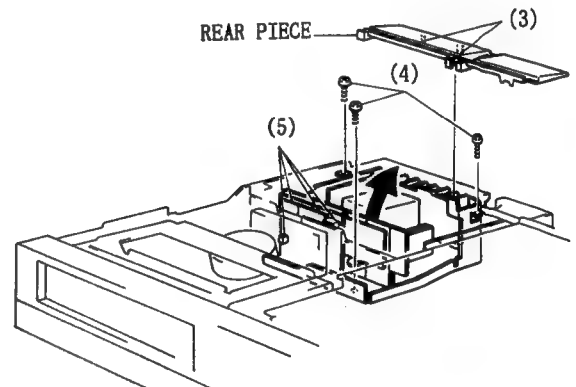


Fig. 4-9 Regulator Circuit Block(II)

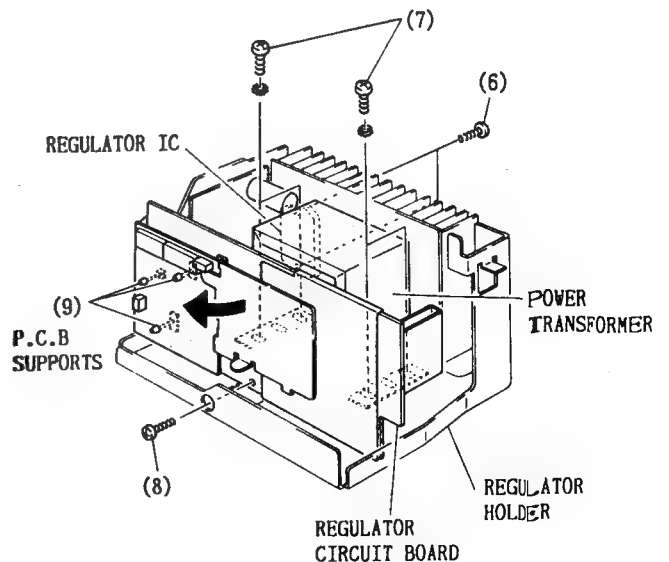


Fig. 4-10 Regulator Circuit Board(III)

7. Pre/Rec Amp Circuit Board (Fig. 4-11)

- 1) Remove the top cover. (See item 2 in the section on case removal)
- 2) Disconnect three (3) connectors.
- 3) Remove one (1) screw.
- 4) Disconnect the connector connected to the cylinder motor while lifting up the pre/rec amp circuit board.

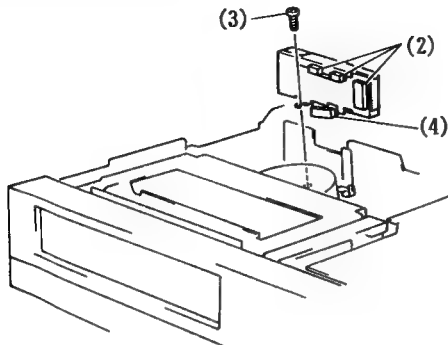


Fig. 4-11 Pre/Rec Amp Circuit Board

8. S-Connector Circuit Board (Fig. 4-12)

- 1) Remove the top cover. (See item 2 in the section on case removal)
- 2) Release two (2) stoppers to remove the rear piece.
- 3) Pull out the S-Connector circuit board in the direction of the arrow.
- 4) Disconnect two (2) connectors.

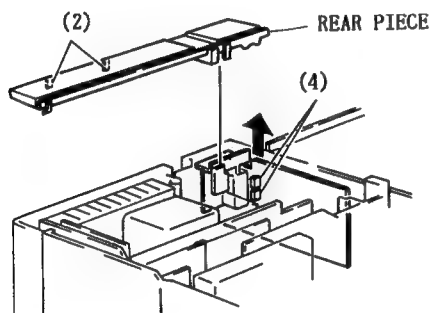


Fig. 4-12 S-Connector Circuit Board

9. Y/C Separate Circuit Board (Fig. 4-13)

- 1) Remove the top cover. (See item 2 in the section on the case removal)
- 2) Open the YTJ circuit board. (See item 4)
- 3) Disconnect three (3) connectors.
- 4) Disconnect one flat cable.
- 5) Release three (3) stoppers and pull out the Y/C separate circuit board.

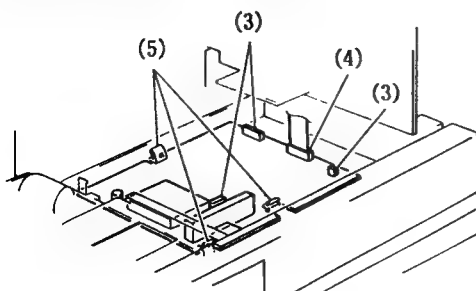


Fig. 4-13 Y/C Separate Circuit Board

10. Sensor Circuit Board (Fig. 4-14)

- 1) Remove the bottom cover. (See item 3 in the section on case removal)
- 2) Remove the reel belt.
- 3) Disconnect the flat cable.
- 4) Disconnect the connector from the cylinder motor circuit board.
- 5) Remove four (4) screws and lift up the sensor circuit board.

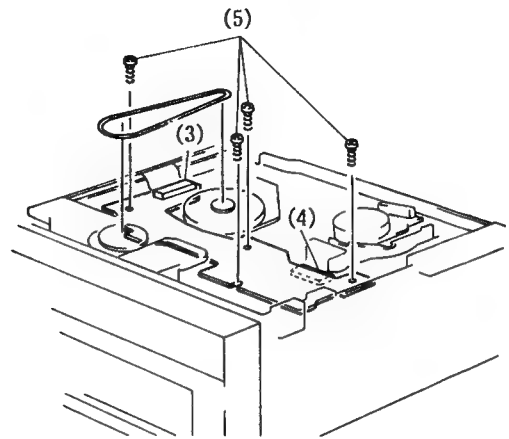


Fig. 4-14 Sensor Circuit Board

5. CASSETTE LOADING MECHANISM REMOVAL

1. Cassette Loading Mechanism and Cassette Door

\* Components listed below are described as if the top and bottom covers, front panel and the cassette loading mechanism have already been removed. (See items 2, 3 and 4 in the section on case removal and item 1 in the section on cassette loading mechanism removal.)

2. Loading Gear Assembly, Chassis Holder, Cassette Holder Assembly and Front Holder
3. Cassette Holder Base and Cassette Holder (L/R)

1. Cassette Loading Mechanism Assembly and Cassette Door (Fig. 5-1)

Cassette Loading Mechanism Assembly

- 1) Remove the top cover and front panel. (See items 2 and 4 in the section on case removal.)
- 2) Remove two (2) screws.
- 3) Lift up the rear of the cassette loading mechanism assembly and release the fittings on the front bottom.

Cassette Door

- 4) Push the left of the front holder outward in the direction of the arrow and remove the cassette door.

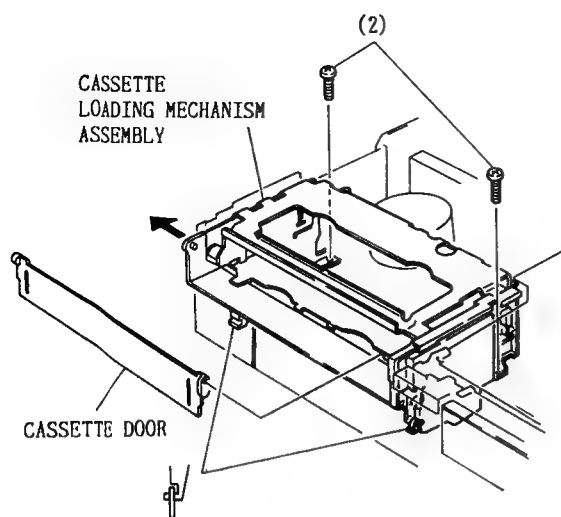


Fig. 5-1 Cassette Loading Mechanism Assembly and Cassette Door

2. Loading Gear Assembly, Chassis Holder, Cassette Holder Assembly and Front Holder Loading Gear Assembly (Fig. 5-2)

- 1) Release two (2) tabs that engage with the chassis holder and one (1) tab that engages with the front holder, then separate the loading gear assembly.

Chassis Holder

- 2) Release two (2) tabs that engage with the front holder.

Cassette Holder Assembly

- 3) Separate the drive gear and remove the cassette holder assembly.

Front Holder

- 4) Remove the shaft pin and drive arm L.

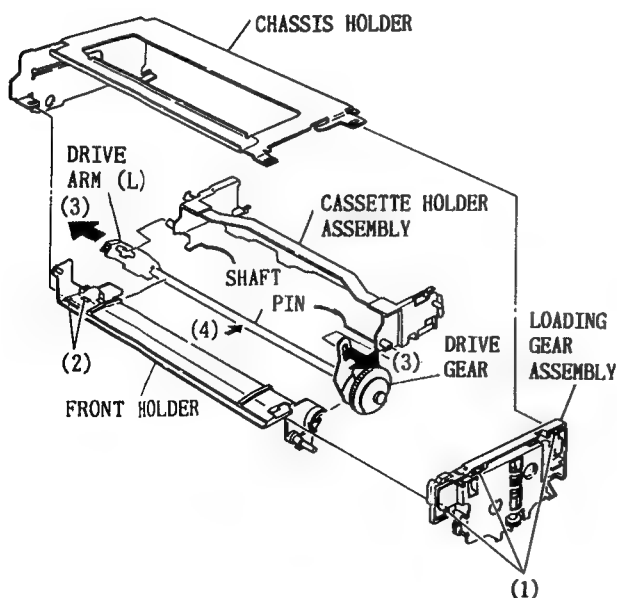


Fig. 5-2 Loading Gear Assembly, Chassis Holder, Cassette Holder Assembly and Front Holder

3. Cassette Holder Base and Cassette Holders (L/R) (Fig. 5-3)

Cassette Holder Base

- 1) Release four (4) tabs on the L/R cassette holders.

Cassette Holders (L/R)

- 2) Release the tabs on the cassette holders L/R and pull out the holders.

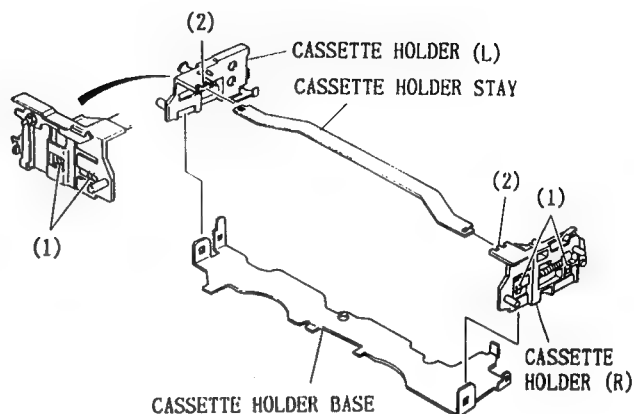


Fig. 5-3 Cassette Holder Base and Cassette Holders (L/R)

[Cautions when reinstalling]

Reinstall the components by the reverse procedure to removal, taking care of the following items.

- \* Check that two (2) bosses of the cassette holder are inserted into the grooves on the left of the chassis holder. (Fig. 5-4)
- \* When reinstalling the loading gear assembly, check that two (2) bosses of the cassette holder are inserted into the grooves on the right of the chassis holder. (Fig. 5-5)
- \* Check that marking (Δ) on the synchro gear and marking (◇) on the clutch gear are aligned. (Fig. 5-5)
- \* Check that the boss of cassette switch lever (A) is set to the cam of the synchro gear.
- \* When reinstalling the cassette door, check that the boss of the door arm is inserted into the groove in the cassette door.

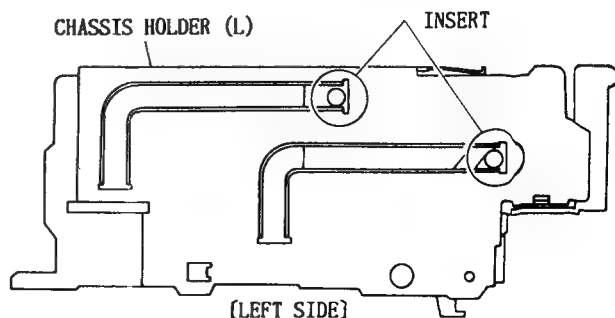


Fig 5-4

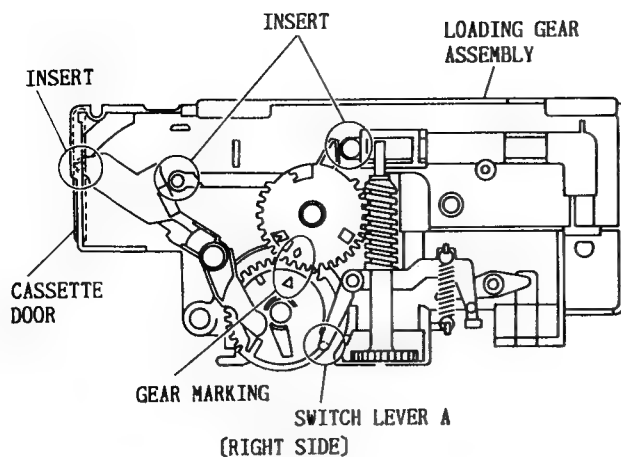


Fig. 5-5

## 6. LOADING GEAR REMOVAL

Side Chassis, FL Worm Gear, Door Arm, Worm Wheel and Switch Levers A/B (Fig. 6-1)

Side Chassis

- 1) Release four (4) tabs that engage with the loading gear assembly.

FL Worm Gear

- 2) Pull out the FL worm gear.

Door Arm

- 3) Remove the spring between the door arm and gear bracket.

- 4) Pull out the door arm.

Worm Wheel

- 5) Pull out the worm wheel.

Switch Levers A/B

- 6) Remove the spring between switch lever (A) and the gear bracket.

- 7) Pull out switch levers (A) and (B).

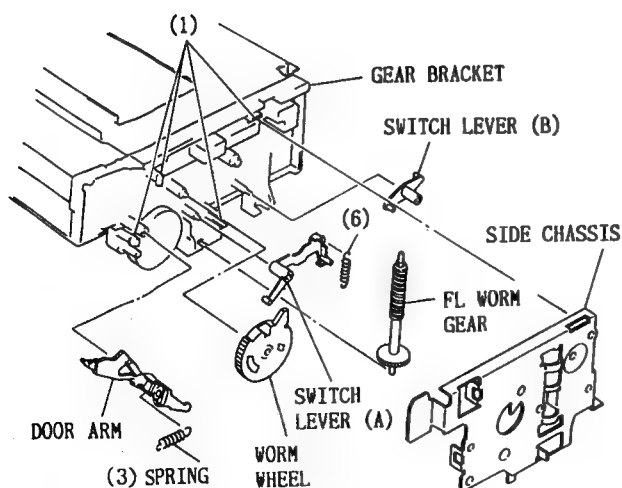


Fig. 6-1 Side Chassis, FL Worm Gear, Door Arm, Worm Wheel and Switch Levers A/B

## 7. MAIN MECHANICAL COMPONENTS REMOVAL

1. Heads
  - ° Impedance Roller/FE (Full Erase) Head
  - ° A/C (Audio/Control) Head
2. Cylinder Motor Assembly
3. Capstan Motor Assembly
4. Loading Motor, Mechanism State Switch Assembly
5. Tension Arm, Tension Band
6. Slider Block, Reel Drive Idler
7. Supply/Take-up Reel Disks, Half Loading Arm, Relay Arm and S-VHS detection switch
8. Rollers and Guides
  - ° Pressure Roller
  - ° Supply Guide Pole
  - ° Take-up Guide Pole
  - ° Supply/Take-up Guide Rollers
9. Loading Motor Assembly, Brake Link Arm and FS Brake Arm
10. Load Bracket Assembly and Take-up Brake
11. Brake Operation Arm, Mode Gear, Worm Wheel, Pressure Roller Operation Arm, Mode Change Arm and Brake Lift Arm
12. Cylinder Motor Base and Supply/Take-up Loading Arms
13. Take-up Pulley and Clutch Gear Assembly
14. Take-up Gear, Change Arm, Change Gear, FL Change Gear and FL Change Lever

Impedance Roller/FE (Full Erase) Head (Fig. 7-1)

- 1) Remove the top cover. (See item 2 in the section on case removal)
- 2) Remove the spring between the FE head base and chassis.
- 3) Disconnect the connector.
- 4) Remove the nut holding the guide pole and pull out the pole.
- 5) Release one (1) tab and remove the impedance roller/FE head.
- 6) To separate the FE head, release two (2) tabs and pull out the FE head.

A/C (Audio/Control) Head (Fig. 7-1)

- 7) Disconnect the connector.
- 8) Remove the nut holding the head base and pull the base up and out.

\* Hook the bottom of the spring under the head base to the chassis and the top to the stopper of the head base.

[Cautions when reinstalling]

\* Check that the spring section of the A/C head retaining screw protrudes 6.3 mm above head base (1)

\* Check that head bases (1) and (2) are parallel.

[Adjustments after reinstallation]

A/C Head Adjustment

X-Value Adjustment

Audio Playback Level Adjustment

Audio Bias Level Adjustment

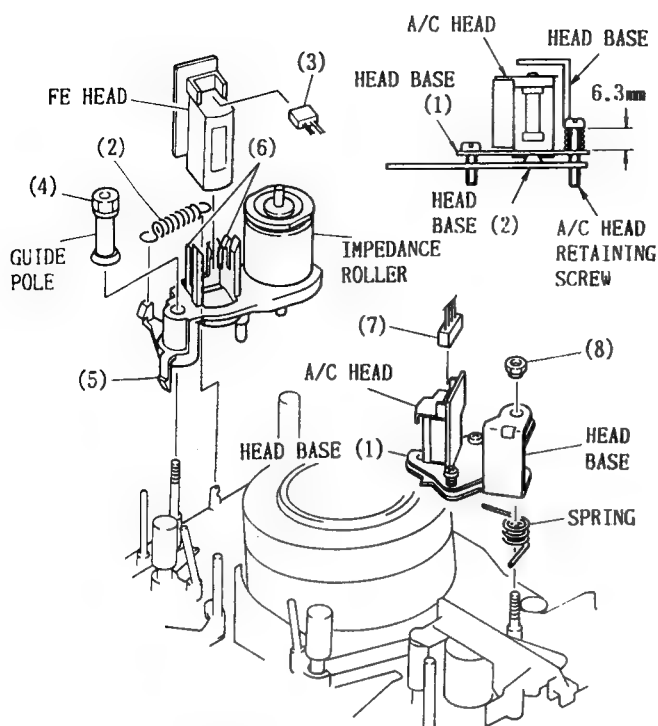


Fig. 7-1 Impedance Roller/FE (Full Erase) Head,  
A/C (Audio/Control) Head

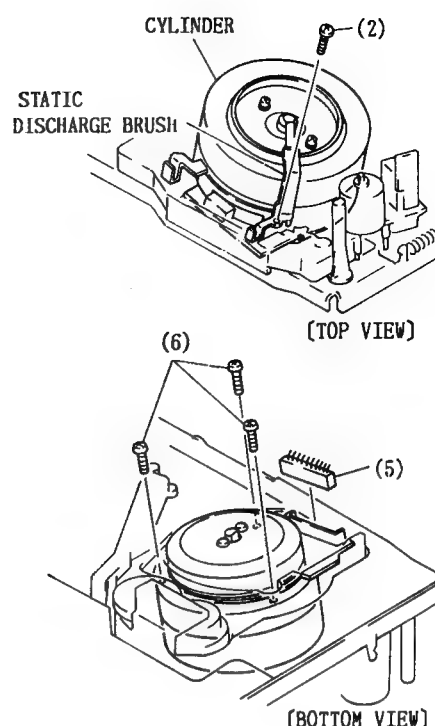


Fig. 7-2 Cylinder Motor Assembly

## 2. Cylinder Motor Assembly (Fig. 7-2)

- 1) Remove the top cover. (See item 2 in the section on case removal)
- 2) Remove one (1) screw and static discharge brush.
- 3) Pull out the pre/rec amp circuit board. (See item 4 in the section on circuit board removal)

(Bottom Side)

- 4) Remove the bottom cover. (See item 3 in the section on case removal)
- 5) Disconnect the connector from the cylinder motor circuit board.
- 6) Remove three (3) screws holding the cylinder.

(Top Side)

- 7) Pull out the cylinder motor assembly upward.

[Cautions during work]

- \* Place the side of the unit down as the screws are in the reverse positions to the direction in which the cylinder is removed.
- \* Do not touch the video head tips with fingers or tools.

[Adjustments after reinstallation]

Adjustments after replacing the cylinder

## 3. Capstan Motor Assembly (Fig. 7-3)

- 1) Remove the bottom cover. (See item 3 in the section on case removal)
  - 2) Remove the reel belt.
  - 3) Disconnect two (2) connectors.
  - 4) Remove one (1) screw and the power transistor circuit board.
  - 5) Remove three (3) screws and pull out the capstan motor assembly.
- \* Keep the capstan shaft clean when removing and reinstalling the capstan motor.

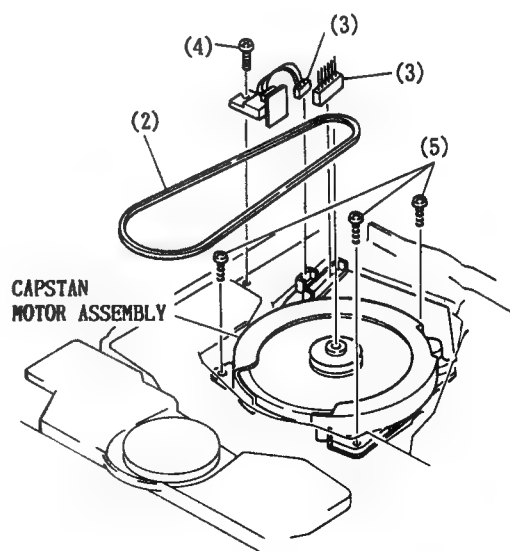


Fig. 7-3 Capstan Motor Assembly

#### 4. Loading Motor/Mechanism State Switch Assembly (Fig. 7-4)

- 1) Remove the top cover. (See item 2 in the section on case removal)
- 2) Release one (1) tab and remove the cassette lid opener.
- 3) Disconnect the connector.
- 4) Release two (2) tabs holding the mechanism state switch.
- 5) Release four (4) tabs, and while releasing two (2) bosses of the motor holder from the screw holes in the motor, lift up the loading motor/mechanism state switch assembly.

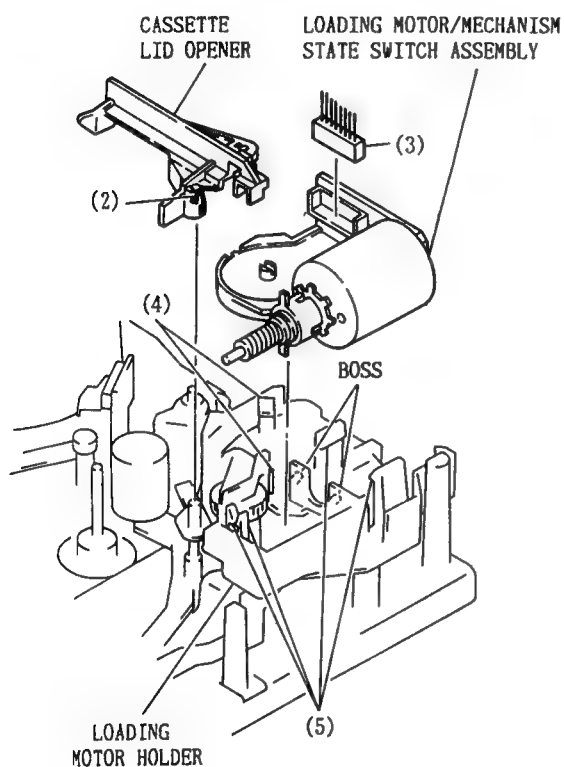


Fig. 7-4 Loading Motor/Mechanism State Switch Assembly

\* Components 5 - 11 listed below will be described as if the top and bottom covers, front panel and the cassette loading mechanism have already been removed. (See items 2, 3 and 4 in the section on case removal and item 1 in the section on cassette loading mechanism removal)

#### 5. Tension Arm/Tension Band (Fig. 7-5)

- 1) Remove the spring between the tension arm and spring holder.
- 2) Remove the screw holding the tension band.
- 3) Release the fitting with the tension arm, move the supply subbrake in the direction of the arrow and remove the tension band and tension arm.

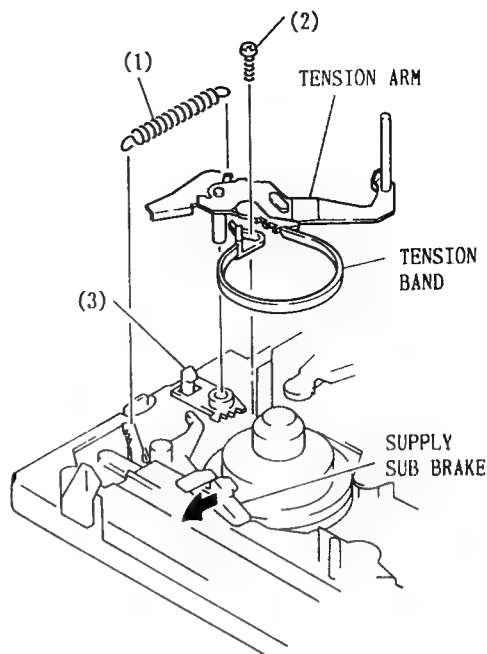


Fig. 7-5 Tension Arm/Tension Band

#### 6. Slider Block and Reel Drive Idler Slider Block (Fig. 7-6)

- 1) Remove two (2) screws.

[Cautions when reinstalling]

- \* Reinstall the slider block while pressing both subbrakes and the main brake in the directions of the arrows (A/B).
- \* Check that the bosses of the load bracket assembly are inserted into the sliders.

#### Reel Drive Idler (Fig. 7-6)

- 2) Pull out the reel drive idler from the take-up gear shaft.

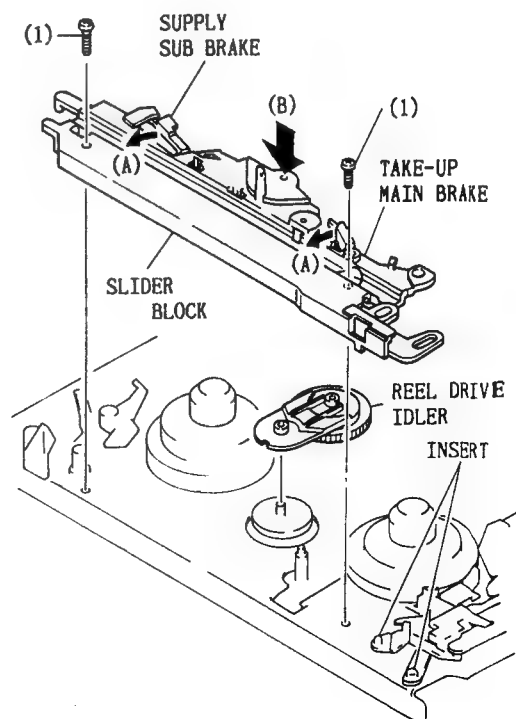


Fig. 7-6 Slider Block and Reel Drive Idler



## 7. Supply/Take-up Reel Disks, Half Loading Arm, Relay Arm and S-VHS switch

### Supply Reel Disk (Fig. 7-7)

- 1) Remove the slider block. (See item 6)
- 2) Remove the tension arm and tension band. (See item 5)
- 3) Pull out the supply reel disk.

#### [Caution when reinstalling]

- \* Check that a spacer is put on the reel disk installation shaft.

#### [Adjustments after reinstalling]

Tension Pole Position and Tension Adjustments  
Reel Disk Height Adjustment

### Take-up Reel Disk (Fig. 7-7)

- 4) Move the take-up brake in the direction of the arrow and pull out the take-up reel disk.

#### [Caution when reinstalling]

- \* Check that a spacer is put on the reel disk installation shaft.

#### [Adjustments after reinstalling]

Reel Disk Height Adjustment

### Half Loading Arm

- 5) Remove the washer and pull out the arm upward.
- \* Hook the bottom of the spring under the half loading arm to the stopper of the take-up guide pole and the top to the stopper of the half loading arm.

### Relay Arm

- 6) Release one (1) tab in the direction of the arrow and remove the relay arm.

### S-VHS Switch

- 7) Remove two (2) screws.
- 8) Release one (1) stopper and pull out the S-VHS switch from the connector on the sensor circuit board.

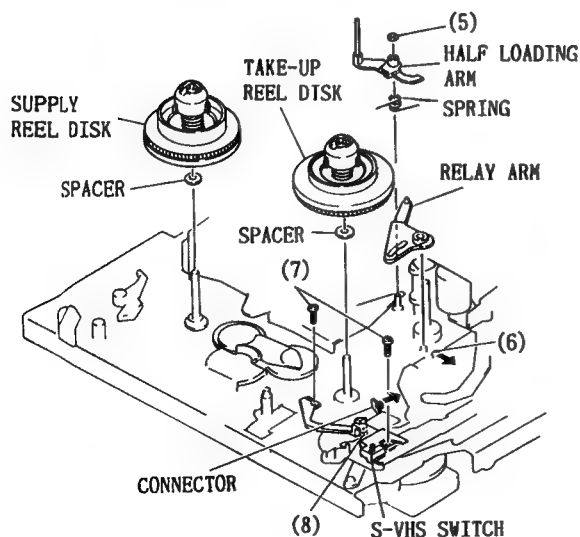


Fig. 7-7 Supply/Take-up Reel Disks, Half Loading Arm, Relay Arm and S-VHS Switch

## 8. Rollers and Guides (Fig. 7-8)

### Pressure Roller

- 1) Release one (1) tab and remove the cassette lid opener.
- 2) Pull out the pressure roller assembly.

#### [Cautions when reinstalling]

- \* Check that the pin of the pressure roller is inserted into the hole in the pressure roller operation arm.
- \* Clean the tape contact surface of the pressure roller.

### Supply Guide Pole

- 3) Loosen the guide pole retaining screw and pull out the guide pole.

#### [Caution when reinstalling]

- \* Clean the tape contact surface of the guide pole.

#### [Adjustment after reinstalling]

Guide Pole Height Adjustment

### Take-up Guide Pole

- 4) Loosen the take-up guide pole retaining screw and pull out the guide pole.

#### [Caution when reinstalling]

- \* Clean the tape contact surface of the guide pole.

#### [Adjustment after reinstalling]

Guide Pole Height Adjustment

### Guide Rollers

- \* Remove the supply and take-up guide rollers by the same procedure.
- 5) Loosen the guide roller retaining hexagonal screw.
- 6) Turn the guide roller counterclockwise to pull it out.

#### [Adjustment after reinstalling]

Guide Roller Height Adjustment

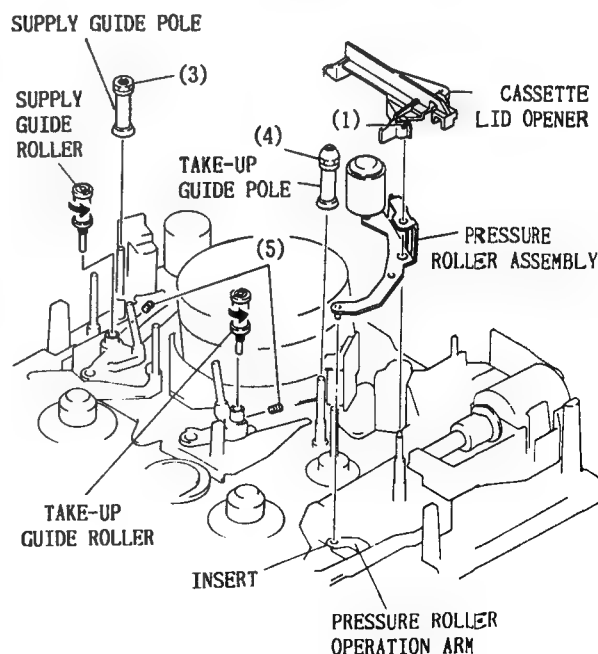


Fig. 7-8 Rollers and Guides

9. Loading Motor Block, Brake Link Arm and FS Brake Arm (Fig. 7-9)

Loading Motor Block

- 1) Release the tab and remove the cassette lid opener.
- 2) Disconnect the connector from the loading motor circuit board.
- 3) Remove two (2) screws and release three (3) tabs.
- 4) Remove the loading motor and motor holder while holding the section indicated by arrow (A) so that the load bracket assembly does not lift.

(Adjustment after reinstallation)

Mechanism State Switch Adjustment

Brake Link Arm

- 5) Remove the slider block. (See item 6)
- 6) Remove the take-up reel disk. (See item 7)
- 7) Remove the S-VHS detection switch. (See item 7)
- 8) Remove the spring between the brake link arm and load bracket.
- 9) Remove the brake link arm.

FS Brake Arm

- 10) Remove the spring between the FS brake arm and mechanism chassis.
- 11) Release one (1) tab and pull out the FS brake arm.

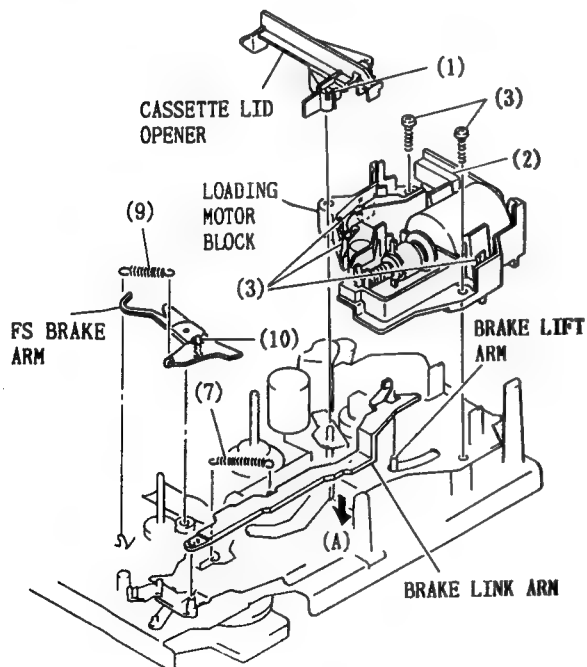


Fig. 7-9 Loading Motor Block, Brake Link Arm FS Brake Arm

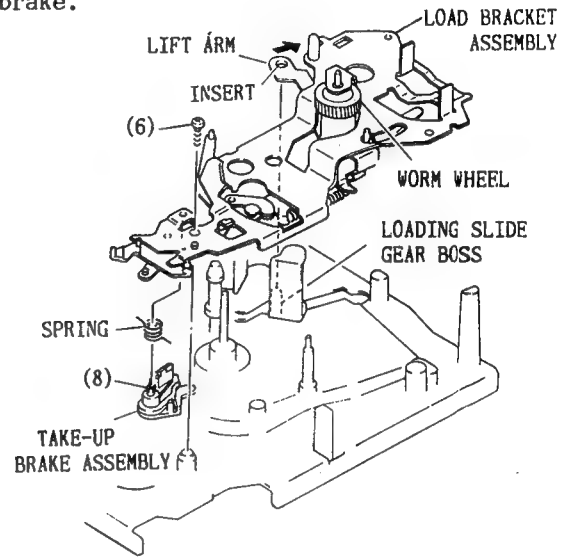
10. Load Bracket Assembly and Take-up Brake Load Bracket Assembly (Fig. 7-10)

- 1) Remove the slider block. (See item 6)
- 2) Remove the take-up reel disk. (See item 7)
- 3) Remove the pressure roller. (See item 8)

- 4) Remove the loading motor block. (See item 9)
- 5) Remove the S-VHS detection switch. (See item 7)
- 6) Remove the brake link arm. (See item 9)
- 7) Remove one (1) screw and draw the boss of the loading slide gear through the hole in the lift arm to lift up the assembly.

Take-up Brake (Fig. 7-10)

- 8) Remove the brake operation arm. (See item 11)
- 9) Release one (1) tab and remove the take-up brake.



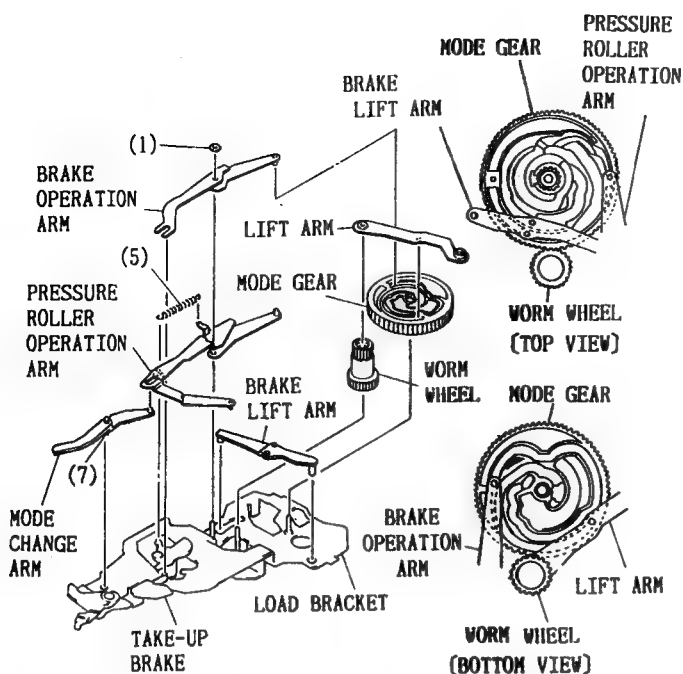


Fig. 7-11 Brake Operation Arm, Mode Gear, Worm Wheel, Pressure Roller Operation Arm, Mode Change Arm and Brake Lift Arm

## 12. Cylinder Motor Base and Supply/Take-up Loading Arms (Fig. 7-12)

### Cylinder Motor Base

- 1) Remove the cassette loading mechanism. (See item 1 in the section on cassette loading mechanism removal)
- 2) Remove the cylinder motor assembly. (See item 2)
- 3) Remove three (3) screws and take out the cylinder motor base.

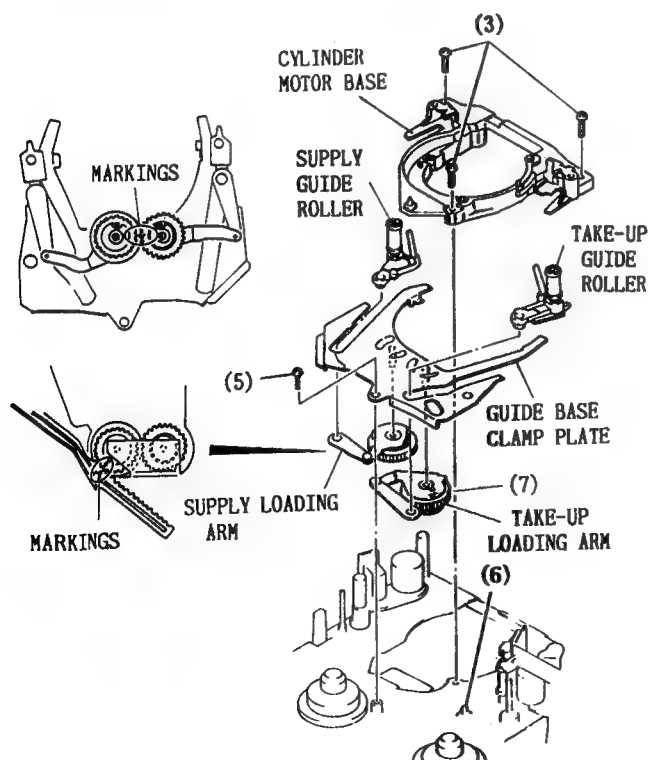


Fig. 7-12 Cylinder Motor Base and Supply/Take-up Loading Arms

## Supply/Take-up Loading Arms (Fig. 7-12)

- 4) Remove the half loading arm. (See item 7)
- 5) Remove one (1) screw.
- 6) Release one (1) tab and remove the guide base clamp plate with the supply/take-up guide rollers assembled on it.
- 7) Release one (1) tab and remove the take-up loading arm.
- 8) Remove the supply loading arm.

## 13. Take-up Pulley and Clutch Gear Assembly

### Take-up Pulley (Fig. 7-13)

- 1) Release the reel belt.
- 2) Remove the washer and pull out the take-up pulley.

### Clutch Gear Assembly (Fig. 7-13)

- 3) Remove the cassette loading mechanism. (See item 1 in the section on cassette loading mechanism removal)
- 4) Remove the slider block and reel drive idler. (See item 6)
- 5) Remove the reel belt in step 1 and remove three (3) screws.

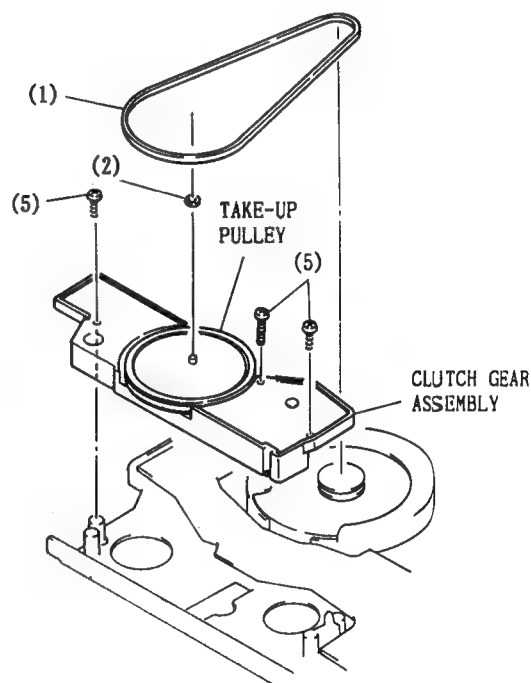


Fig. 7-13 Take-up Pulley and Clutch Gear Assembly

## 14. Take-up Gear, Change Arm, Change Gear, Relay Gear, FL Change Gear and FL Change Lever (Fig. 7-14)

- 1) Remove the cassette loading mechanism. (See item 1 in the section on cassette loading mechanism removal)
- 2) Remove the slider block and reel drive idler. (See item 6)
- 3) Remove the clutch gear assembly. (See item 13)

#### Take-up Gear

- 4) Remove the washer and pull out the take-up gear.

#### Change Arm, Change Gear

- 5) Remove the take-up gear.
- 6) Release one (1) tab and remove the spring hooked to the change arm.
- 7) Release two (2) tabs and remove the change arm.
- 8) Remove the washer and pull out the change gear.

#### Relay Gear

- 9) Release one (1) tab and pull out the relay gear.

#### FL Change Gear, FL Change Lever

- 10) Remove the cap, spring and washer and pull out the FL change gear.
- 11) Release two (2) tabs and remove the FL change lever.

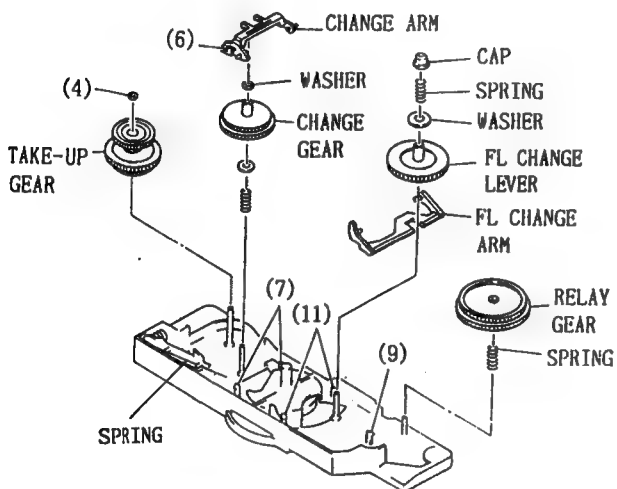


Fig. 7-14 Take-up Gear, Change Arm, Change Gear, Relay Gear, FL Change Gear and FL Change Lever

#### 8. ATTACHING THE ROTOR MAGNET PLATE TO THE CYLINDER MOTOR

When the rotor magnet plate is removed for repairs or it is replaced, reinstall it correctly observing the following caution item.  
[Caution on installation]

- \* The rotor magnet plate attached to the base of the the cylinder motor (illustrated as the top in the figure below) is equipped with magnetic poles. If it is attached in reverse, the VTR will not operate normally. Attach it correctly following the procedure below.

#### [How to attach]

- \* There are holes in the rotor magnet plate and cylinder plate attaching bracket. Attach the rotor magnet plate so that hole (A) in the plate and hole (B) in the bracket across from the screw holes.

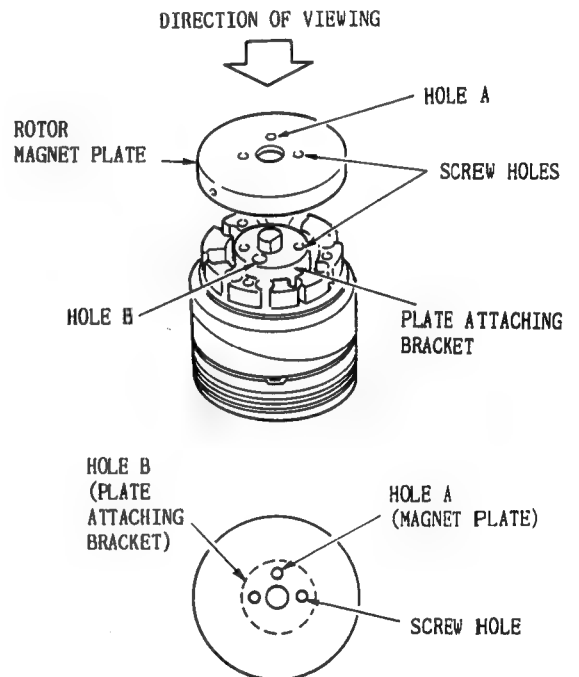


Fig. 7-15 Rotor Magnet Plate Attachment Position

## ELECTRIC CIRCUIT ADJUSTMENT

Test equipment and tapes necessary for adjustment.

- 1) Dual-trace oscilloscope
- 2) Colour bar generator
- 3) VTVM
- 4) DC voltmeter
- 5) Frequency counter
- 6) Monitor TV
- 7) Alignment tape (MH-2)
- 8) Hi-Fi alignment tape (36HMAFE-3-1)
- 9) Blank tape (VHS, S-VHS)

**Cautions on adjustments**

- 1) If there are no special instructions, the following conditions apply:
  - Oscilloscope probe: 10:1
  - Oscilloscope synchronization: Auto-Sync

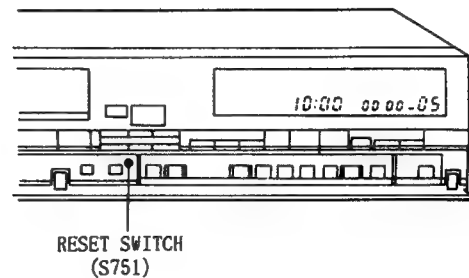
• Tracking control: center click.

• Slow tracking control: electrical centre  
(Press RESET switch S751 to set the slow tracking to the centre electrically)

- 2) When making more than one adjustment, make adjustments in the order listed.

**Resetting microprocessors**

The microprocessors used in this unit can be reset by pressing switch (S751) on the timer/operation switch circuit board.



**Servicing Positions**

Place the unit in the horizontal position as shown in Fig. 1 and adjust the YTJ circuit board.

Adjust the SSA circuit board with the left side down as shown in Fig. 2.

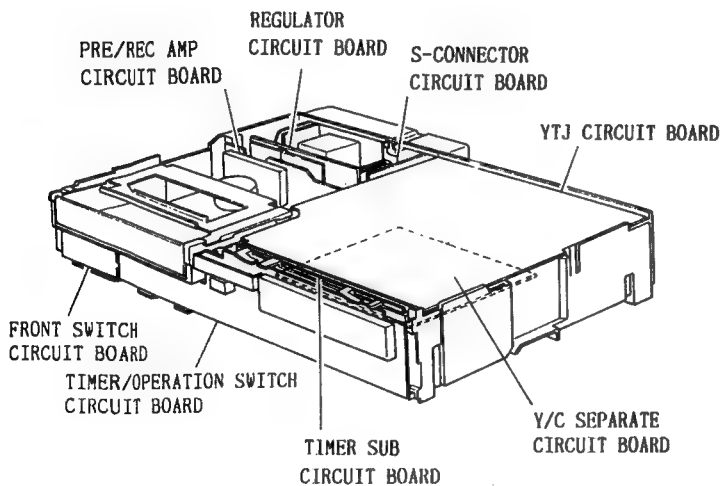


Fig. 1 Top View

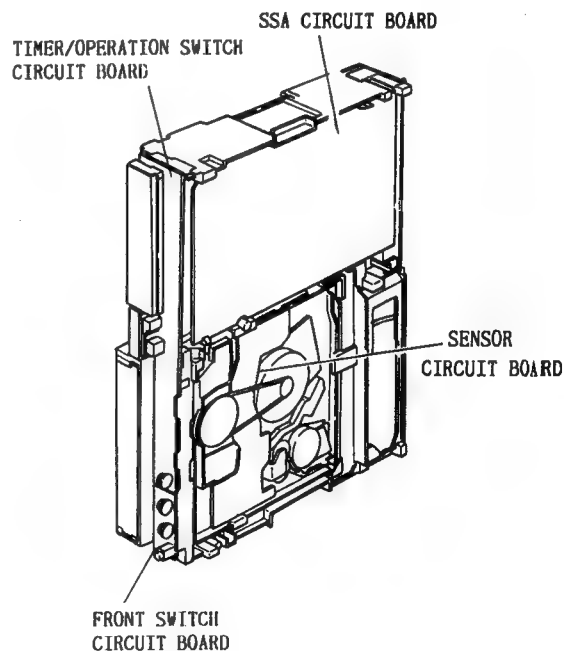


Fig. 2 Bottom View

# COMPONENT LOCATIONS ON CIRCUIT BOARD

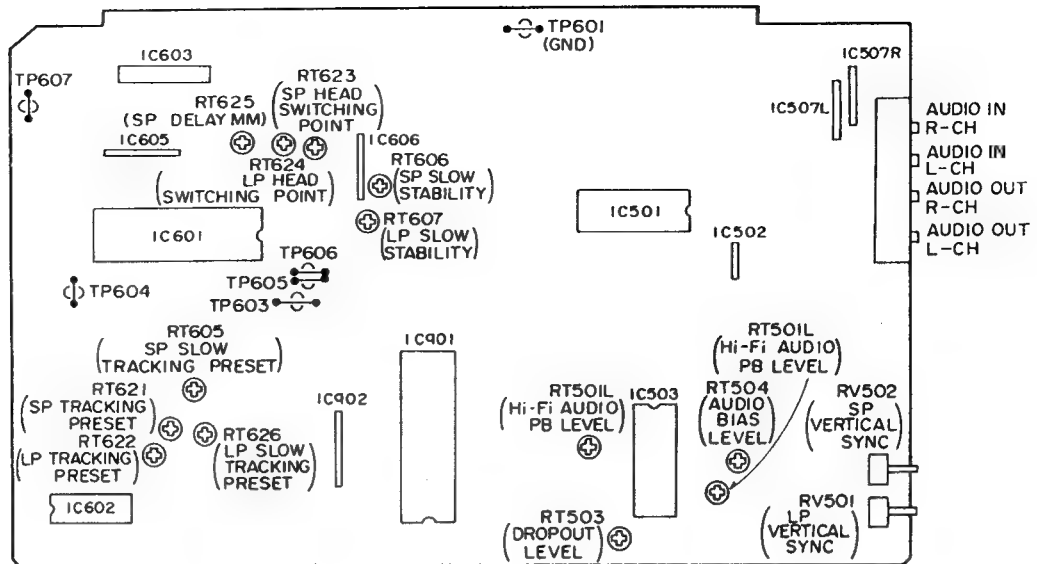


Fig. 3 Components on SSA Circuit Board  
(Solder Side)

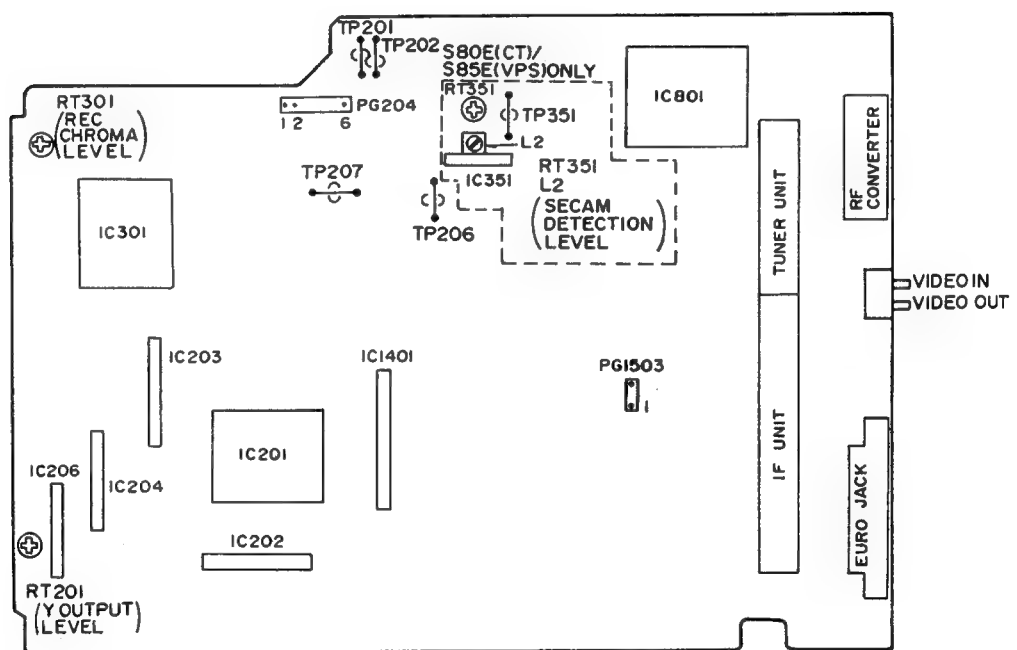


Fig. 4 Components on YTJ Circuit Board  
(Solder Side)

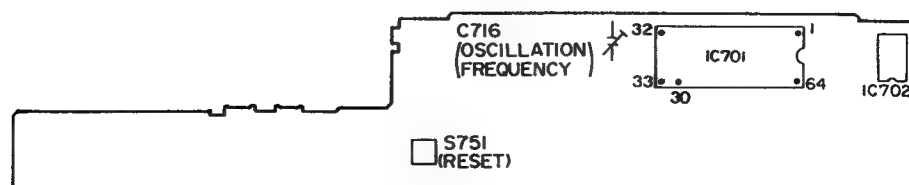


Fig. 5 Timer/Operation Switch Circuit Board (Components Side)  
(For S80E(CT)/S85E(VPS))

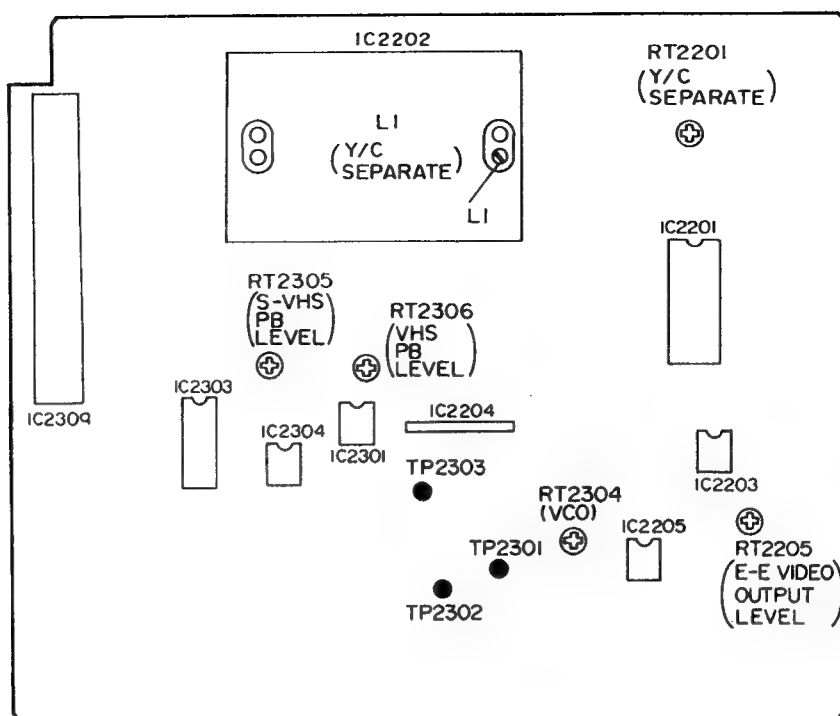


Fig. 6 Components on Y/C Separation Circuit Board  
(Components Side)

## 1. SERVO CIRCUIT ADJUSTMENTS

### 1. SP Delay MM Adjustment

Purpose of adjustment and fault occurring if incomplete

Purpose: To optimize the compatibility of X value.

Fault: • Compatibility cannot be obtained.

• Noise appears in the picture.

Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
• Oscilloscope	• CH-1: TP606 (CTL DELAY MM)	• Tracking control: Centre	• RT625
• Alignment tape (MH-2) (Parts No. 7099052)	• CH-2: TP605 (TRACKING MM)	• Playback alignment tape (Stairsteps)	
<b>Adjustment Procedure</b> (Settings of oscilloscope) <ul style="list-style-type: none"> <li>• Trigger with CH-2</li> <li>• Set sync slope to "—"</li> </ul> 1) Peak of CTL Delay MM: $10 \pm 0.1$ msec. from the trailing edge (trigger point) of tracking MM.		<b>Waveforms</b>	

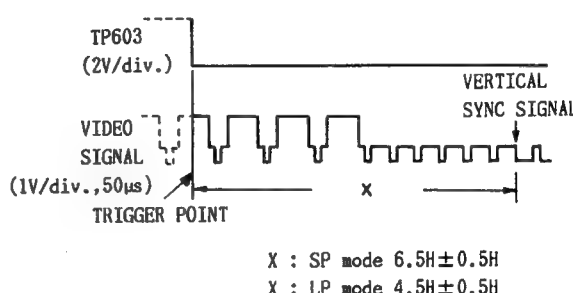


## 2. Head Switching Point Adjustment

Purpose of adjustment and fault occurring if incomplete

Purpose: Set the video head switching point to almost the centre where the CH-1 and CH-2 envelopes overlap each other during playback.

Fault: • The vertical sync signal is degraded and vertical jitter occurs.  
• Switching noise occurs in lower part of picture.

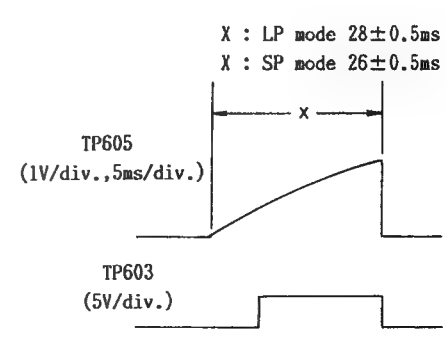
Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Points
• Oscilloscope	• CH-1: VIDEO OUT jack • CH-2: TP603 (SW25Hz)	• Tracking control: Centre • Playback alignment tape (Staisteps)	• RT623 (SP) • RT624 (LP)
• Alignment tape (MH-2) (Parts No. 7099052)			
<b>Adjustment Procedure</b> [Settings of oscilloscope] • Trigger with CH-2 • Set sync slope to “—”  <u>SP Head Switching Point (RT623)</u> 1) Vertical sync signal: $6.5H \pm 0.5H$ from trailing edge (trigger point) of SW25Hz pulse. <u>LP Head Switching Point (RT624)</u> 2) Connect a jumper between TP206 and TP207 on the YIJ circuit board. 3) Vertical sync signal: $4.5H \pm 0.5H$ from trailing edge (trigger point) of SW25Hz pulse. 4) Remove the jumper.		<b>Waveforms</b>  	

## 3. Tracking Preset Adjustment

Purpose of adjustment and fault occurring if incomplete

Purpose: Optimize tracking when playing back a tape recorded by this unit.

Fault: • Noise occurs even with tracking control centred.  
• Noise cannot be removed by turning the tracking control.

Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Points
• Oscilloscope	• CH-1: TP605 (TRACKING MM) • CH-2: TP603 (SW25Hz)	• Tracking control: Centre • Record colour bar signal and play it back with this unit	• RT621 (SP) • RT622 (LP)
• Colour bar generator	• VIDEO IN jack (US pin)		
• Blank tape			
<b>Adjustment Procedure</b> [Settings of oscilloscope] • Trigger with CH-2 • Set sync slope to “—”  <u>LP Tracking Preset (RT622)</u> 1) Tape speed select switch: LP 2) Record colour bar signal and play it back with this unit. 3) Width of tracking MM pulse: $28 \pm 0.5 \text{ msec.}$ <u>SP Tracking Preset (RT621)</u> 4) Tape speed select switch: SP 5) Record colour bar signal and play it back with this unit. 6) Width of tracking MM pulse: $26 \pm 0.5 \text{ msec.}$		<b>Waveforms</b>  	

#### 4. Slow Tracking Preset Adjustment

Purpose of adjustment and fault occurring if incomplete

Purpose: To adjust the timing to generate a brake pulse for the capstan motor during slow play and minimize noise.

Fault: Noise appears in the slow motion picture which is difficult to see.

Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Points
• Monitor TV	• VIDEO OUT jack or RF OUT	• Record colour bar signal and play it back in slow mode.	• RT605 (SP)
• Colour bar generator	• VIDEO IN jack(US pin)	• Slow Tracking Control: Electrical Centre	• RT626 (LP)
<b>Adjustment Procedure</b> <u>SP Slow Tracking Preset (RT605)</u> 1) Tape speed select switch: SP 2) Record colour bar signal and play it back with this unit. 3) Move noise to the bottom of the monitor TV. <u>LP Slow Tracking Preset (RT626)</u> 4) Tape speed select switch: LP 5) Record colour bar signal and play it back with this unit. 6) Move noise to the bottom of the monitor TV.			

#### 5. Slow Stability Adjustment

Purpose of adjustment and fault occurring if incomplete

Purpose: Suppress the horizontal jitter in the picture during slow play.

Fault: Horizontal jitter occurs in the picture during slow play.

Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Points
• Monitor TV	• VIDEO OUT jack or RF OUT	• Record colour bar signal and play it back in slow mode.	• RT606 (SP)
• Colour bar generator	• VIDEO IN jack(US pin)	• Slow Tracking Control: Electrical Centre	• RT607 (LP)
<b>Adjustment Procedure</b> <u>SP Slow Stability (RT606)</u> 1) Tape speed select switch: SP 2) Record colour bar signal and play it back with this unit in slow mode. 3) Suppress vertical jitter in monitor TV. <u>LP slow Stability (RT607)</u> 4) Tape speed select switch: LP 5) Record colour bar signal and play it back with this unit in slow mode. 6) Suppress vertical jitter in monitor TV.			

## 6. Vertical Sync. Adjustment

Purpose of adjustment and fault occurring if incomplete

Purpose: Change timing for adding vertical drive pulse and suppress vertical jitter in picture during still mode.

Fault: Vertical jitter occurs in the during still mode.

Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Points
• Monitor TV	• VIDEO OUT jack or RF OUT	• Record colour bar signal and play it back with this unit in STILL mode.	• RV502 (SP) • RV501 (LP)
• Colour bar generator	• VIDEO IN jack		
<b>Adjustment Procedure</b> <u>SP Vertical Sync. (RV502)</u> 1) Tape speed switch: SP 2) Record colour bar signal and play it back with this unit in STILL mode. 3) Suppress vertical jitter in monitor TV. <u>LP Vertical Sync. (RV501)</u> 4) Tape speed select switch: LP 5) Record colour bar signal and play it back with this unit in STILL mode. 6) Suppress vertical jitter in monitor TV.			

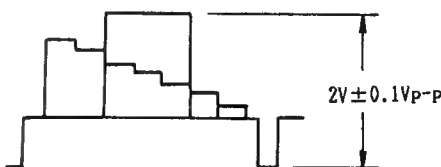
## 2. Y/CHROMA CIRCUIT ADJUSTMENTS

### 1. E-E Y Output Level Adjustment

Purpose of adjustment and fault occurring if incomplete

Purpose: To set the luminance signal output to the specified level.

Fault: The correct brightness cannot be obtained.

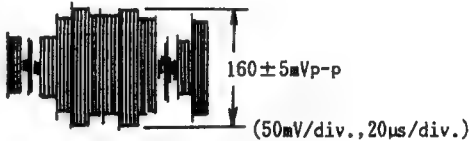
Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
• Colour bar generator	• VIDEO IN jack (US pin)	• Receive colour bar signal (LINE IN)	• RT201
• Oscilloscope	• PG1503-1	• E-E mode	
Adjustment Procedure RT201: Set the E-E Y output level to the 2Vp-p. (75 ohms terminated)		Waveform  PG1503-1 (0.2Vdiv., 20µs/div.)	

## 2. Chroma Record Level Adjustment

Purpose of adjustment and fault occurring if incomplete

Purpose: Set the chroma record level to an optimum value.

Fault: Diamond beats occur in the played back picture or colouring becomes poor.

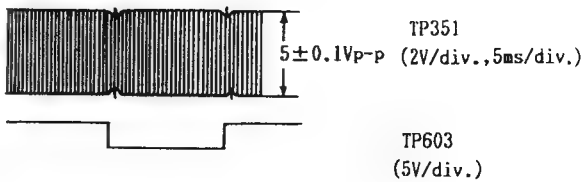
Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
• Colour bar generator	• VIDEO IN jack(US pin)	• Receive colour bar signal (LINE IN)	• RT301
• Oscilloscope	• PG204-2	• Record mode	
<b>Adjustment Procedure</b> RT301: Set the chroma level to $160 \pm 5 \text{ mVp-p}$ .		<b>Waveform</b> 	

## 3. SECAM Detection Level Adjustment (SECAM) [For S80E(CT)/S85E(VPS)]

Purpose of adjustment and fault occurring if incomplete

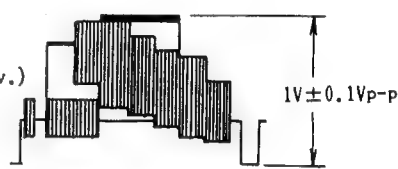
Purpose: Fine tune the SECAM killer level.

Fault: During automatic discrimination PAL and SECAM are discriminated incorrectly.

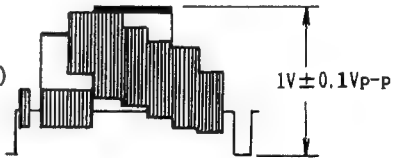
Test Equipment/Jigs	Test Equipment Connection Point	VTR State	Adjustment Point
• SECAM colour bar generator (Full colour bar)	• VIDEO IN jack(US pin)	• Record mode	• RT351 • L2(included in IC351)
• Oscilloscope	• CH-1: TP351 • CH-2: TP603 (SW25Hz)		
• Blank tape			
<b>Adjustment Procedure</b> [Settings of oscilloscope] • Trigger with CH-2 1) RT351: Set the SECAM Detection level to $5 \pm 0.1 \text{ Vp-p}$ . 2) When the SECAM detection level is higher than 5V, adjust L2 (in IC351) so the level becomes $5 \pm 0.1 \text{ Vp-p}$ .		<b>Waveforms</b> 	

### 3. Y/C SEPARATE CIRCUIT ADJUSTMENTS


#### 1. E-E Video Output Level Adjustment

Purpose of adjustment and fault occurring if incomplete Purpose: To set the video output level in the EE mode to a specified value. Fault: The correct tint and brightness cannot be obtained.			
Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
• Colour bar generator • Oscilloscope	• VIDEO IN jack(US pin) • VIDEO OUT jack(US pin)	• Receive colour bar signal (LINE IN) • E-E mode	• RT2205
Adjustment Procedure RT2205: Set the E-E video output level to $1 \pm 0.1V_{p-p}$ . (75 ohms terminated)		Waveform VIDEO OUT (0.2Vdiv., 20 $\mu$ s/div.) 	

#### 2. S-VHS Playback Level Adjustment

Purpose of adjustment and fault occurring if incomplete Purpose: To set the video output level in the S-VHS mode to a specified value. Fault: The correct tint and brightness cannot be obtained.			
Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
• Colour bar generator • Oscilloscope • Blank tape (S-VHS)	• VIDEO IN jack(US pin) • VIDEO OUT jack(US pin)	• Receive colour bar signal and play it back with this unit • Tracking Control: Centre • S-VHS mode	• RT2305
Adjustment Procedure RT2305: Set the S-VHS playback level to the $1 \pm 0.1V_{p-p}$ . (75 ohms terminated)		Waveform VIDEO OUT (0.2Vdiv., 20 $\mu$ s/div.) 	

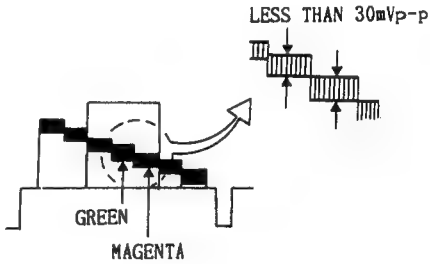
#### 3. VHS Playback Level Adjustment

Purpose of adjustment and fault occurring if incomplete Purpose: To set the video output level in the VHS mode to a specified value. Fault: The correct tint and brightness cannot be obtained.			
Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
• Colour bar generator • Oscilloscope • Black tape	• VIDEO IN jack(US pin) • VIDEO OUT jack(US pin)	• Record colour bar signal and play it back with this unit • Tracking Control: Centre • VHS mode	• RT2306
Adjustment Procedure RT2306: Set the VHS playback level to $1 \pm 0.1V_{p-p}$ . (75 ohms terminated)		Waveform VIDEO OUT (0.2Vdiv., 20 $\mu$ s/div.) 	

#### 4. VCO

Purpose of adjustment and fault occurring if incomplete Purpose: Set the reference clock frequency of the skew detector circuit. Fault: Skew occurs in the picture during I.P trick play.			
Test Equipment/Jigs	Test Equipment Connection Point	VTR State	Adjustment Point
• Frequency counter	• TP2303	• E-E mode (Non-signal)	• RT2304
Adjustment Procedure 1) Connect a jumper between TP2301 and TP2302. 2) RT2304: Set the frequency counter reads $30.5^{+0.4}_{-0.1}$ kHz.			

#### 5. Y/C Separation Adjustment

Purpose of adjustment and fault occurring if incomplete Purpose: To separate the luminance (Y) signal from the video signal correctly. Fault: • Colours smear. • Moire pattern occurs.			
Test Equipment/Jigs	Test Equipment Connection Point	VTR State	Adjustment Points
• Colour bar generator • Oscilloscope	• VIDEO IN jack(US pin) • S-connector (Y output)	• Receive colour bar signal (LINE IN)	• RT2201 • L1 (included in IC2202)
Adjustment Procedure 1) L1: Minimize chroma signals on the green and magenta sections. 2) RT2201: Suppress chroma signals on the green and magenta sections to less than 30mVp-p. (terminated with 75 ohms)		Waveform 	

### 4. AUDIO CIRCUIT ADJUSTMENTS

#### 1. Hi-Fi Audio Playback level Adjustment

Purpose of adjustment and fault occurring if incomplete Purpose: To set the Hi-Fi audio playback level to the specified value. Fault: The proper sound volume cannot be obtained.			
Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Points
• VTVM • Hi-Fi alignment tape (36HMAFE-3-1) (Parts No. 7099175)	• AUDIO OUT jack(US pin) (L-CH or R-CH)	• Playback Hi-Fi alignment tape • AUDIO switch: AUTO position	• RT501L(L-CH) • RT501R(R-CH)
Adjustment Procedure <u>L-CH Hi-Fi Audio PB Level (RT501L)</u> 1) Connect a VTVM to the L-CH AUDIO OUT jack. 2) RT501L: The VTVM reads $-4.8 \pm 0.1$ dBs. <u>R-CH Hi-Fi Audio PB Level (RT501R)</u> 3) Connect a VTVM to the R-CH AUDIO OUT jack. 4) RT501R: The VTVM reads $-4.8 \pm 0.1$ dBs. 5) Perform the dropout level adjustment after this adjustment is completed.			

## 2. Dropout Level Adjustment

Purpose of adjustment and fault occurring if incomplete Purpose: To set the dropout detection level and muting level of FM audio signal. Fault: • Noise occurs even with a minute dropout of envelope. • Hi-Fi audio is not switched to linear audio when an envelope is missed.			
Test Equipment/Jigs	Test Equipment Connection Point	VTR State	Adjustment Point
• DC voltmeter • Alignment tape (MH-2) (Parts No. 7099052)	• TP501	• Playback alignment tape • AUDIO Switch: AUTO position	• RT503
Adjustment Procedure 1) Connect a jumper between TP505 and TP504(GND). 2) Connect a jumper between TP506 and TP504(GND). 3) The DC voltmeter reads $2.5 \pm 0.1V$ DC. 4) Remove the jumpers.			

## 3. Audio Bias level Adjustment

Purpose of adjustment and fault occurring if incomplete Purpose: To set audio bias during recording to optimum level. Fault: • Bias too high: High-frequency response deteriorates. • Bias too low: Sound tends to be distorted.			
Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
• VTVM	• TP502 (BIAS) • TP503 (BIAS GND)	• Non-signal recording	• RT504
Adjustment Procedure 1) RT504: The VTVM reads $2.3 \pm 0.1mV$ .			

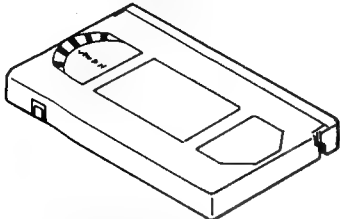
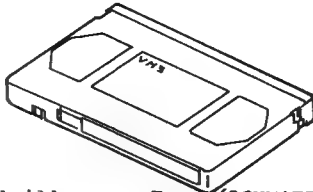
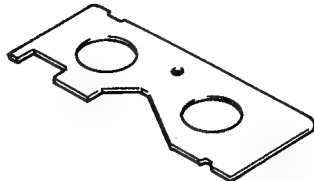
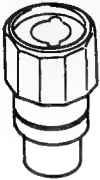

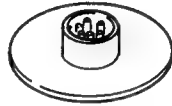
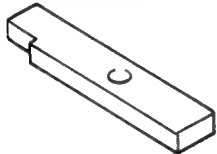
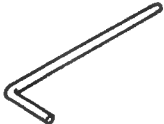
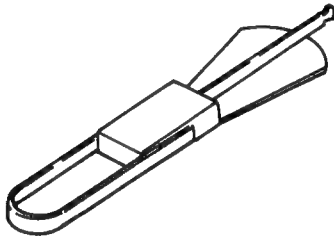
## 5. TIMER CIRCUIT ADJUSTMENT (For S80E(CT)/S85E(VPS))

### 1. Oscillation Frequency Adjustment

Purpose of adjustment and fault occurring if incomplete Purpose: Suppress the time gain or lag of the timer less than 0.2 seconds per day. Fault: The clock will malfunction.			
Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
• Frequency counter	• IC701-30 • IC701-32 (GND)	• Stop mode	• C716
Adjustment Procedure C716: The frequency counter reads $32768 \pm 2Hz$ . Note: Be careful when applying an adjustment driver to C716 because the stray capacitance of the driver may vary the frequency.			

# MECHANISM ADJUSTMENT

## JIGS AND TAPES FOR ADJUSTMENT

<p>1. Back Tension Meter Parts No.7099004</p> 	<p>2. Alignment Tape (MH-2) Parts No. 7099052</p>  <p>Hi-Fi Alignment Tape (36HMAFE-3-1) Parts No. 7099175</p>	<p>3. Master Plane Parts No.7099279</p> 
<p>4. Torque Gauge Parts No.7099039</p> 	<p>5. Torque Gauge Adaptor Parts No.7099035</p> 	<p>6. Dummy Reel Parts No.7099043</p> 
<p>7. Reel Disk Height Jig Parts No.7099038</p> 	<p>8. 1.5mm Hexagonal Wrench 0.9mm Hexagonal Wrench</p> 	<p>9. Fan-type Tension Gauge</p> 

# MECHANICAL PARTS ADJUSTMENT

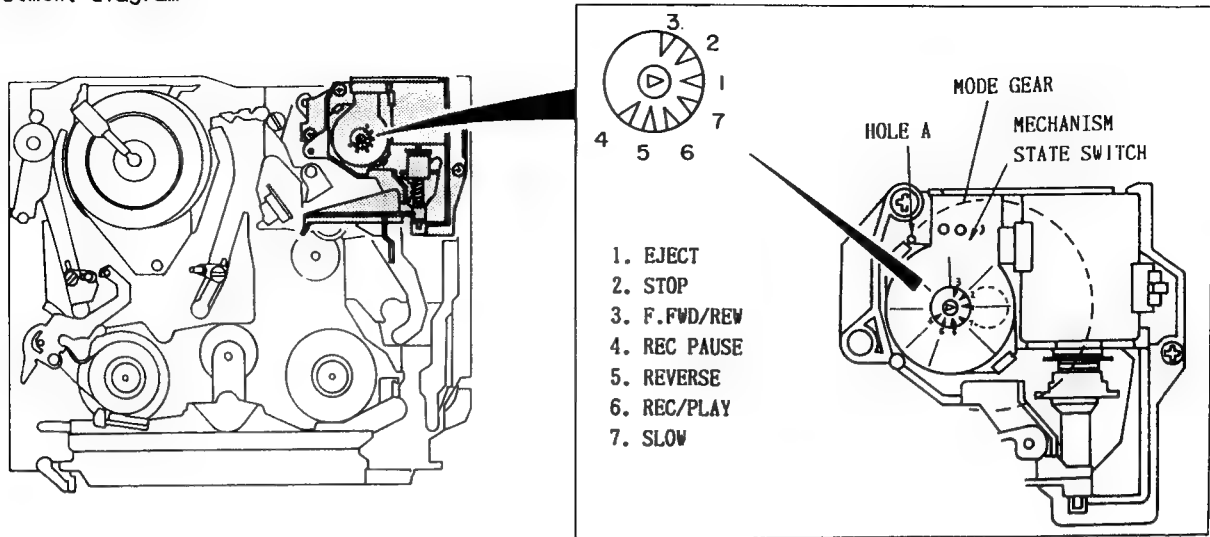
## 1. Mechanism State Switch

**Purpose:** To detect the mechanism state correctly and prevent malfunctions.

Test equipment/jigs	Preparation for adjustment	State of VTR	Adjustment points
• Blank tape	—	• Eject mode (with the cassette ejected)	• Mechanism state switch • Mode gear
<p><b>Adjustment procedure</b></p> <p>1) Check that the arrow on the centre shaft of the mechanism state switch points to the arrow of mechanism mode indication number 1. Also check that hole (A) beside the mechanism state switch and the hole in the mode gear are aligned.</p> <p>2) If the above alignments are not obtained, adjust as follows.</p> <p>1. Remove the mechanism state switch/loading motor assembly. (See "MAIN MECHANICAL COMPONENTS REMOVAL" in CHAPTER 2.)</p>		<p>2. Move the mode gear to align the position of hole (A).</p> <p>3. Turn the gear on the back of the mechanism state switch so that the arrow on the centre shaft of the switch points to the arrow of mechanism mode indication number 1.</p> <p>4. Reinstall the mechanism state switch/loading motor assembly in the above condition.</p> <p>3) Load a blank tape and perform various operations to check that loading and unloading are performed correctly.</p>	



Adjustment diagram



## TAPE TRANSPORT SYSTEM PARTS ADJUSTMENT

The tape transport system is the path from the supply reel disk passing through the video heads to the take-up reel disk. The transport system parts, especially the parts which directly come into contact with a tape, should be kept clean without scratches, dust, oil, etc.

The tape transport system has been adjusted before the unit is shipped from the factory. Therefore, when parts in the transport system are replaced, the transport system is stabilized by only adjusting the new parts correctly.

### 1. Reel Disk Height Adjustment

**Purpose:** To set the reels of the cassette to the specified height, thus determining the height of tape.

Test equipment/jigs	Preparation for adjustment	State of VTR	Adjustment points
<ul style="list-style-type: none"> <li>Master plane (Parts No.7099279)</li> <li>Reel disk height jig (Parts No.7099038)</li> </ul>	<ol style="list-style-type: none"> <li>Remove the cassette loading mechanism.</li> <li>Mount the master plane and place the reel disk height jig on it.</li> </ol>	—	<ul style="list-style-type: none"> <li>Spacers in the supply and take-up reel disks</li> </ul>
<b>Adjustment procedure</b> <ol style="list-style-type: none"> <li>Check that the reel disk is between sections A and B of the reel disk height jig.</li> <li>If the disk is not between sections A and B of the jig, replace the spacer (0.5mm thick) in the reel disk or adjust them.</li> </ol> <p>[Caution] When the tension arm and tension band are removed, adjust the tension pole position and tension after reinstalling them.</p>		<b>Adjustment diagram</b> <p>REEL DISK HEIGHT JIG MASTER PLANE REEL DISK CHASSIS SPACER SUPPLY REEL DISK TAKE-UP REEL DISK</p>	

## 2. Tension Pole Position and Tension Adjustment

**Purpose:** To make the tension of tape constant so that the contact between the video heads and tape is stabilized.

Test equipment/jigs	Preparation for adjustment	State of VTR	Adjustment points
Position adjustment —	—	1) Remove the top cover. 2) Set the VTR to the loading state without inserting a cassette. (See page 4-10)	Position adjustment: Tension band holder
Tension adjustment • Back Tension Meter (Parts No.7099004)	—	Tension adjustment 3) Play the tension cassette.	Tension adjustment: Tension spring hooking position

### Adjustment procedure

#### - Position Adjustment -

- 1) Loosen the tension band retaining screw.
- 2) Insert the tension band holder into one of grooves 1 to 3 and set the gap between the tension pole and chassis to  $-0.5$  to  $2\text{mm}$ .
- 3) Tighten the tension band retaining screw.
- 4) After adjustment is completed, perform loading without inserting a cassette and recheck the tension pole position.

#### - Tension Adjustment -

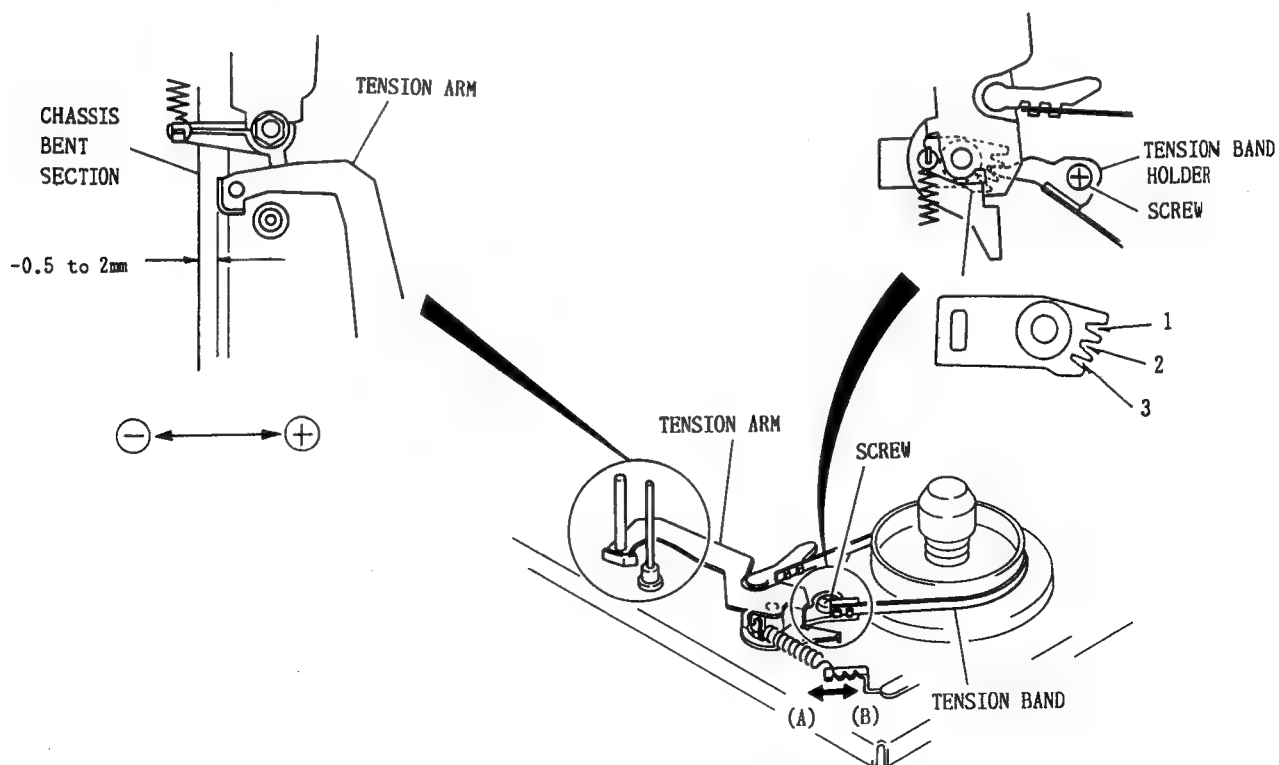
Reading of Back Tension Meter:  $34$  to  $44\text{ g-cm}$   
(reference value)

If the reading is higher than the reference, move the spring in direction (A)

If the reading is lower than the reference, move the spring in direction (B).

**Caution:** When the tension position was changed greatly (more than  $6\text{ g-cm}$ ), recheck the tension pole position. If it is drifted, readjust the tension pole position and tension.

### Adjustment diagram



### 3. Guide Pole Height Adjustment

Purpose: To regulate the tape height.			
Test equipment/jigs	Preparation for adjustment	State of VTR	Adjustment points
<ul style="list-style-type: none"><li>• Master plane (Parts No.7099279)</li><li>• Reel disk height jig (Parts No.7099038)</li></ul>	<ol style="list-style-type: none"><li>1) Remove the cassette loading mechanism.</li><li>2) Mount the master plane and place the reel disk height jig on it.</li></ol>	—	<ul style="list-style-type: none"><li>• Nuts on the supply and take-up guide poles</li></ul>
• Blank tape	—	• Playback mode	
Adjustment procedure			
<ol style="list-style-type: none"><li>1) Set the clearance between the bottom of the guide pole's upper flange and top of the reel disk height jig is 0 to 0.2mm.</li><li>2) Load a blank tape to run it and check that the tape does not ride over the upper and lower flanges of the guide pole.</li></ol>		<ol style="list-style-type: none"><li>3) If the tape rides over either flange, adjust the height of guide pole as follows. If the tape rides over the upper flange, turn the nut counterclockwise. If the tape rides over the lower flange, turn the nut clockwise.</li></ol>	
Adjustment diagram			

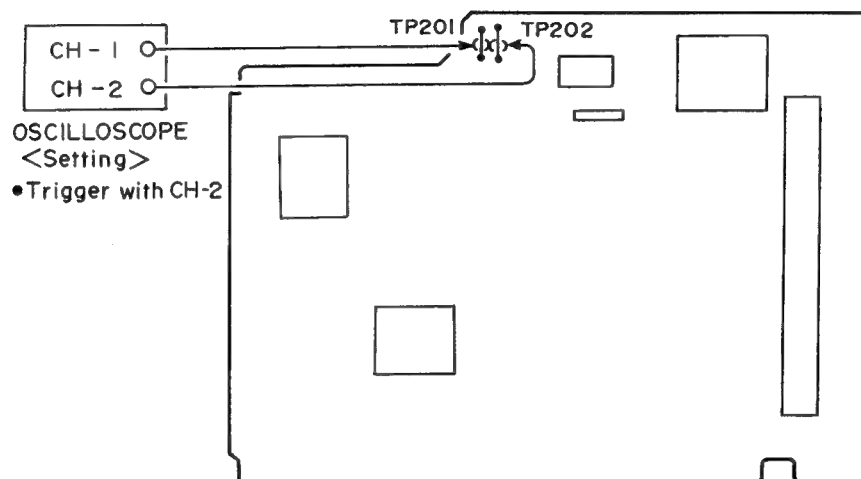
### 4. Guide Roller Height Adjustment

Purpose: To regulate the height of tape so that the bottom of tape runs along the tape guide line on the cylinder.			
<b>Coarse Adjustment</b>			
Test equipment/jigs	Preparation for adjustment	State of VTR	Adjustment points
<ul style="list-style-type: none"> <li>• Master plane (Parts No.7099279)</li> <li>• Reel disk height jig (Parts No.7099038)</li> <li>• 0.9mm Hexagonal wrench</li> </ul>	<ol style="list-style-type: none"> <li>1) Remove the cassette loading mechanism.</li> <li>2) Mount the master plane and place the reel disk height jig on it.</li> </ol>	—	Height adjustment screws on the supply and take-up guide rollers
<b>Adjustment procedure</b> <ol style="list-style-type: none"> <li>1) Loosen the guide roller retaining screw (so that the guide roller does not turn during loading, unloading and play).</li> <li>2) Align the bottom of the guide roller's upper flange and the top of the reel disk height jig.</li> <li>3) Perform the precise adjustment continuously.</li> </ol>		<b>Adjustment diagram</b>	

# Precise Adjustment

Test equipment/jigs	Test equipment connection points	State of VTR	Adjustment points
<ul style="list-style-type: none"> <li>• Oscilloscope</li> </ul>	<ul style="list-style-type: none"> <li>• CH-1: TP201 (PB FM)</li> <li>• CH-2: TP202 (SW 25Hz)</li> </ul>	<ul style="list-style-type: none"> <li>• Play alignment tape. (Colour bars)</li> </ul>	<ul style="list-style-type: none"> <li>• Guide roller height adjustment screws</li> </ul>
<ul style="list-style-type: none"> <li>• Alignment tape (MH-2) (Parts No.7099052)</li> <li>• 0.9mm Hexagonal wrench</li> </ul>	—		

## Connection diagram

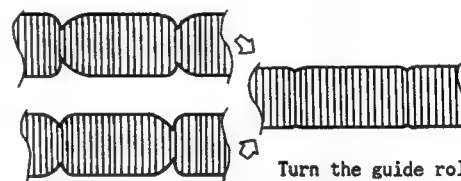


VTJ Circuit Board (Components Side)

## Adjustment procedure

- 1) Tracking control : Centre position (when this adjustment is performed after the cylinder has been replaced, set the tracking control so that the FM output is maximum.)
- 2) Height adjustment screw: Flatten the FM envelope.
- 3) Turn the tracking control clockwise and counterclockwise (to the right and left).
- 4) Check that the FM drops at the start and end of FM envelope are uniform.
- 5) Tighten the guide roller retaining screw.

## Waveforms



Turn the guide roller height adjustment screw slightly to flatten the FM envelope.



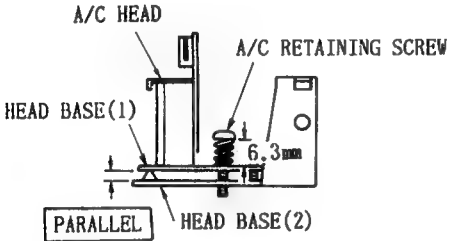
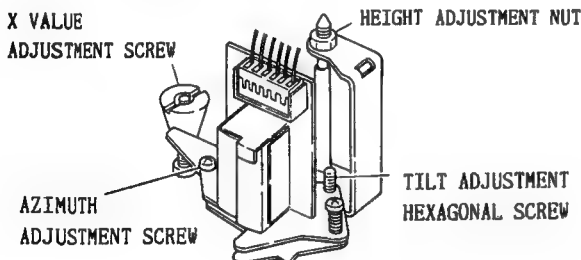
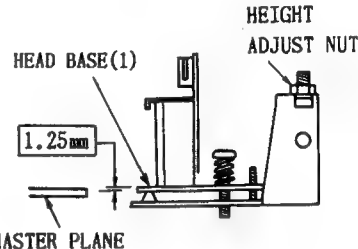
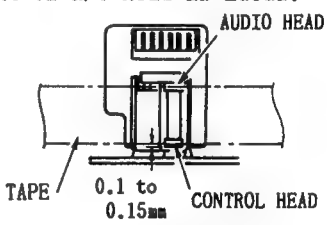
Tracking control at centre

Turn the tracking control to both directions.

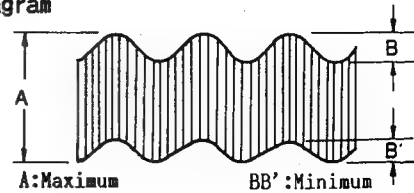
## 5. Audio / Control (A/C) Head Adjustment

**Purpose:** To keep the contact between the tape and head even so the specified track is recorded and played back.

### Coarse Adjustment

Test equipment/jigs	Preparation for adjustment	State of VTR	Adjustment points
<ul style="list-style-type: none"> <li>• Master plane (Parts No.7099279)</li> <li>• Reel disk height jig (Parts No.7099038)</li> <li>• 1.5mm Hexagonal wrench</li> <li>• Blank tape</li> </ul>	<ol style="list-style-type: none"> <li>1) Remove the cassette loading mechanism.</li> <li>2) Mount the master plane and place the reel disk height jig on it.</li> </ol>	<p>—</p>	<ul style="list-style-type: none"> <li>• A/C head retaining screw</li> <li>• Azimuth adjustment screw</li> <li>• Height adjustment nut</li> <li>• Tilt adjustment screw</li> </ul>
<p><b>Adjustment procedure/adjustment diagrams</b></p> <p>1) A/C head retaining screw: Check that the spring section of the A/C head retaining screw protrudes 6.3mm over the top of head base (1).</p>  <p>2) Tilt adjustment hexagonal screw, azimuth adjustment screw: Make head bases (1) and (2) parallel.</p>  <p>3) Height adjustment nut: Set the clearance between the master plane and head base (1) to approx. 1.25mm</p> 		<p>• Run the blank tape.</p>	<ol style="list-style-type: none"> <li>4) Remove the adjustment jigs, load a blank tape and set the VTR to the play mode.</li> <li>5) Check that there is no conspicuous curling and riding over around the A/C head. If there is conspicuous curling or riding over, readjust the tilt adjustment hexagonal screw, azimuth adjustment screw and height adjustment nut. When the bottom edge of tape is 0.1 to 0.15mm from the bottom edge of the control head's core, the height of A/C head is ideal.</li> </ol> 
<p>6) Perform the precise adjustment continuously.</p>			

### Precise Adjustment

Test equipment/jigs	Test equipment connection point	State of VTR	Adjustment points
<ul style="list-style-type: none"> <li>• Oscilloscope</li> <li>• Alignment tape (MH-2) (Parts No.7099052)</li> <li>• 1.5mm Hexagonal wrench</li> </ul>	<ul style="list-style-type: none"> <li>• AUDIO OUT jack</li> </ul>	<ul style="list-style-type: none"> <li>• Play alignment tape (Stairsteps)</li> </ul>	<ul style="list-style-type: none"> <li>• Azimuth adjustment screw</li> <li>• Height adjustment nut</li> <li>• Tilt adjustment screw</li> </ul>
<p><b>Adjustment procedure</b></p> <p>1) Adjust the azimuth adjustment screw, height adjustment nut and tilt adjustment hexagonal screw slightly and alternately: Make the audio output maximum and flat (minimum fluctuations).</p>		<p><b>Waveform diagram</b></p> 	

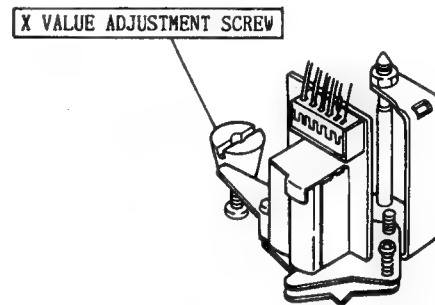
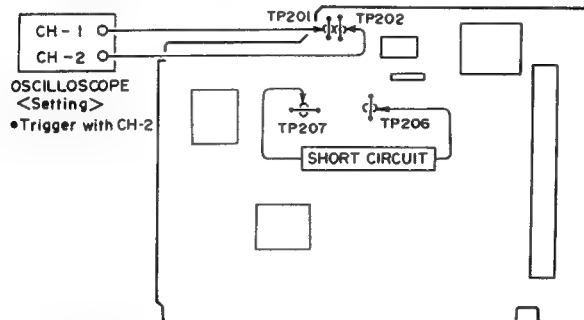
## 6. X Value Adjustment

**Purpose:** To obtain compatibility with other VTRs.

**Note:** Always perform the tracking preset adjustment (page 3-3) that should be done when the cylinder is replaced before adjusting the X value.

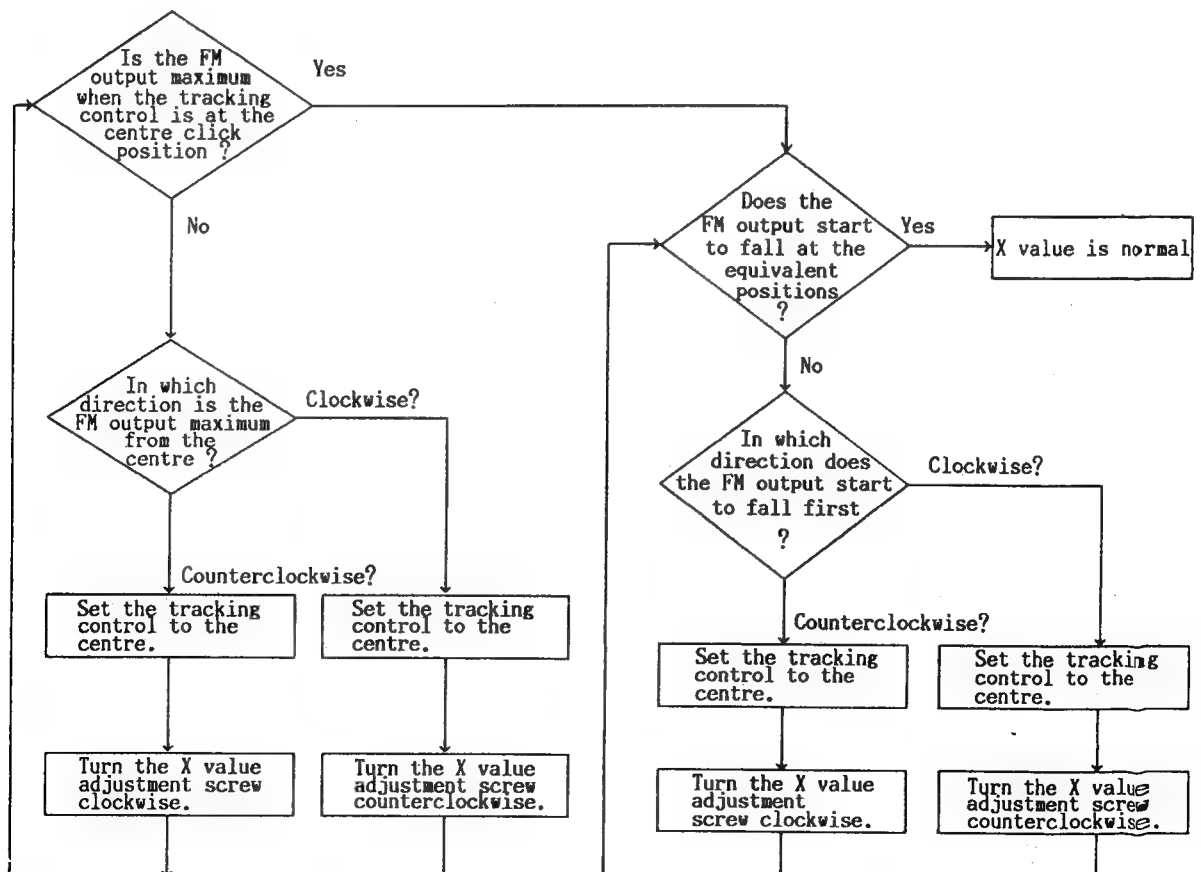
Test equipment/jigs	Test equipment connection points	State of VTR	Adjustment point
• Oscilloscope	• CH-1: TP201 (PB FM) • CH-2: TP202 (SW 25Hz)	• Play alignment tape (Stairsteps)	• X value adjustment screw
• Alignment tape (MH-2) (Parts No.7099052)	—		
• 1.5mm Hexagonal wrench			

Connection diagram YTJ Circuit Board (Components Side)

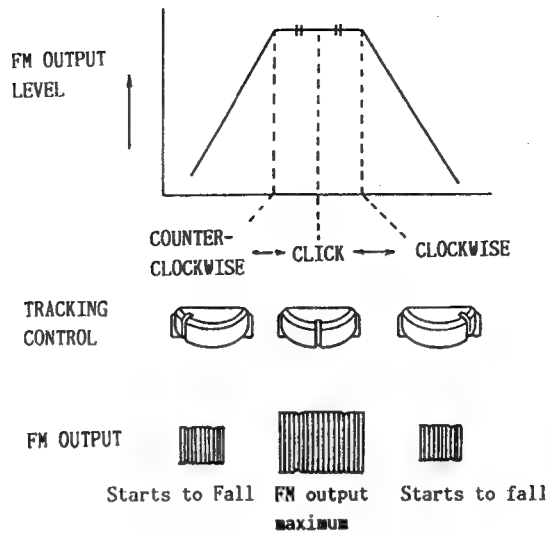


### Adjustment procedure

Adjust so that the FM output is maximum when the tracking control is at the centre click position and it starts to fall at the equivalent angles when the control is turned clockwise/counter-clockwise.



## Adjustment diagram

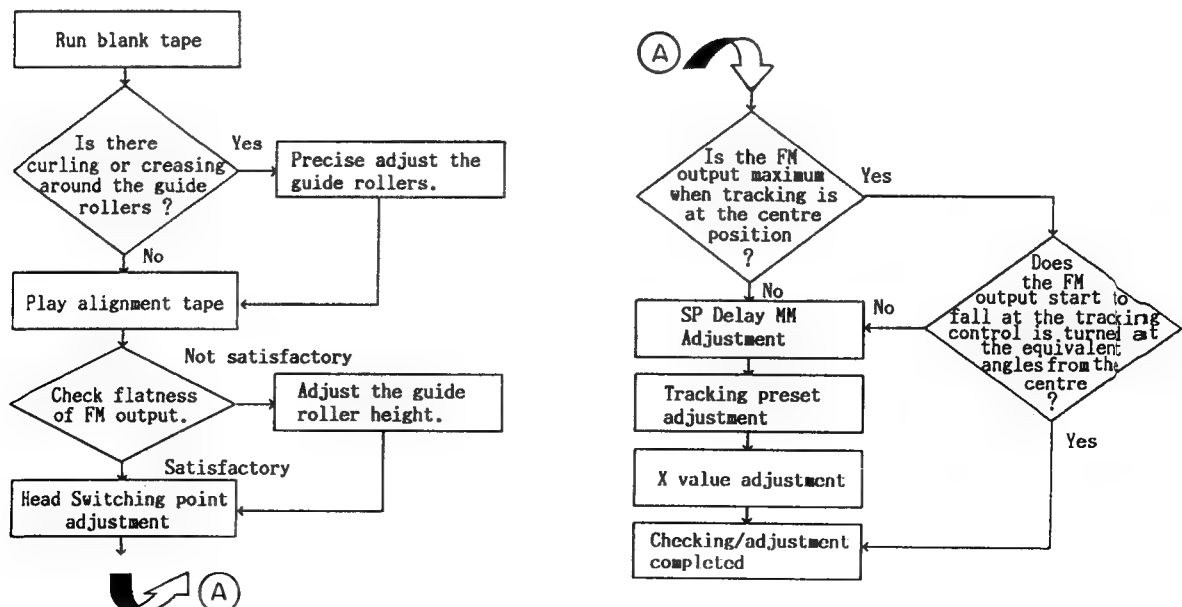


## 7. Adjustments After Replacing Cylinder (Video Heads)

**Purpose:** To suppress drift in the height relative to the guide roller and to minimize the X value after replacing the cylinder.

Test equipment/jigs	Test equipment connection points	State of VTR	Adjustment points
<ul style="list-style-type: none"> <li>• Oscilloscope</li> <li>• Alignment tape (MH-2) (Parts No.7099052)</li> <li>• Blank tape</li> <li>• 0.9mm/1.5mm Hexagonal wrenches</li> <li>• X value adjustment screwdriver</li> </ul>	<ul style="list-style-type: none"> <li>• Checking the flatness</li> <li>• CH-1: TP201 (PB FM)</li> <li>• CH-2: TP202 (SW 25Hz)</li> </ul>	<ul style="list-style-type: none"> <li>• Run the blank tape</li> <li>• Play alignment tape (Stairsteps)</li> </ul>	<ul style="list-style-type: none"> <li>• Guide rollers (precise adjustment on page 4-5)</li> <li>• Head switching point (page 3-4)</li> <li>• Tracking preset (page 3-4)</li> <li>• X value (page 4-7)</li> </ul>

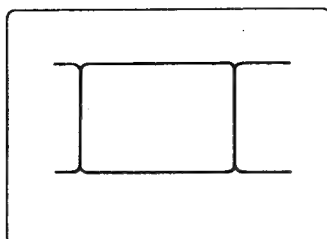
## Checking/adjustment procedure



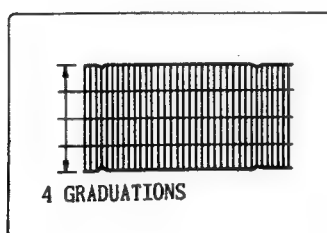


Checking procedure of the flatness and fluctuations of FM output and waveform diagrams

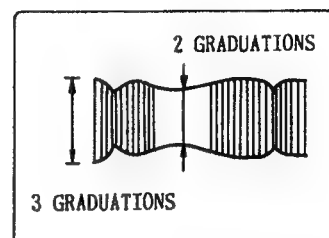
- 1) Use the tracking control to maximize the FM output.



- 2) Fine tune the voltage level range of the oscilloscope to set the FM output to 4 graduations.



- 3) Turn the tracking control to set the maximum amplitude of the FM output to 3 graduations.
- 4) Check that the minimum amplitude is more than 2 graduations.



- 5) Check that the level fluctuations between the maximum and minimum amplitudes are less than 13%.

## 8. Tension/Torque Checks

**Purpose:** It is necessary to check the tension, torque and compression force at the tape take-up section and moving section to make the tape running smooth and satisfy the basic performance of the VTR. Check these if the tape running is not smooth or the tape speed is abnormal.

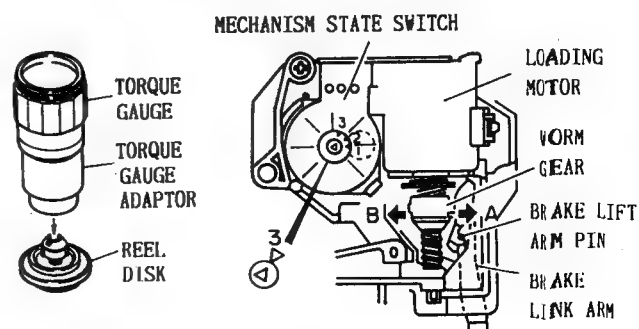
Test equipment/jigs		State of VTR	
<ul style="list-style-type: none"> <li>• Torque gauge</li> <li>• Torque gauge adaptor</li> </ul>		<ul style="list-style-type: none"> <li>• Set the VTR to each operation mode without inserting a cassette.</li> </ul> (See page 4-10)	
Item	VTR operation mode	Measured reel	Measured value
Main brake torque	Stop (Note)	Supply & take-up reels	170 g · cm or more
Slack removal torque	Unloading	Supply reel	90 ~ 230 g · cm
Fast forward torque	Fast forward	Take-up reel	400 g · cm or more
Rewind torque	Rewind	Supply reel	400 g · cm or more
Take-up torque	Play	Take-up reel	80 ~ 170 g · cm
Back-tension torque	Fast forward	Supply reel	4 ~ 25 g · cm
	Rewind	Take-up reel	

### Checking method

The values are measured using a torque gauge and a torque gauge adaptor with the torque gauge fixed.

**Note:** Turn the worm gear in the direction of arrow (A) in the stop mode and shift the pointer on the mechanism state switch to "3" so as to apply the main brake to the supply reel disk. Then turn the worm gear in the direction of arrow (B) so that brake link arm is released from the brake lift arm pin. (Set the reel drive idler to the centre position.)

### Adjustment diagram



### 9. To Set the VTR to the Loading State without Inserting a Cassette

- 1) Remove the top cover and front panel.
- 2) Remove the cassette loading mechanism.
- 3) Unplug the power lead from the AC outlet.
- 4) Cover the supply and take-up end sensors (sections A in the figure below) with black masking tape, etc. to shut off the light.
- 5) Plug the power lead into the AC outlet.
- 6) Turn "ON" the operate switch of the VTR.

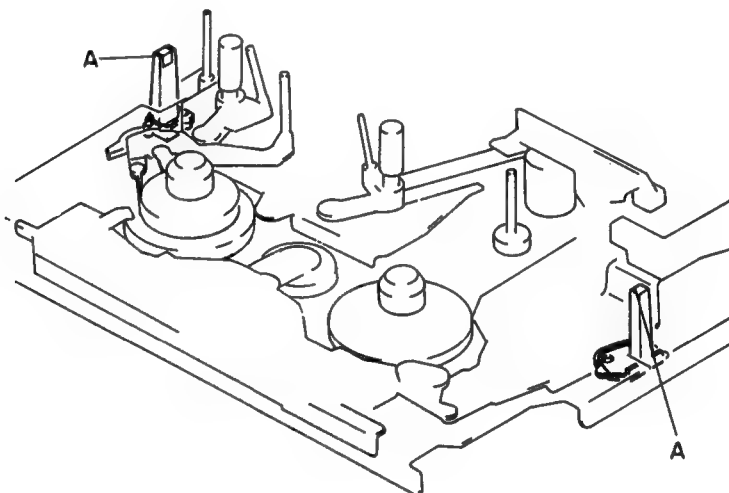
The VTR can accept the inputs of each mode in this state. However, the rewind operation cannot be performed for more than a few seconds because the take-up reel disk is in the stop state and reel pulses cannot be detected.

#### [Cautions]

Always return the VTR to the original state in the following order after the above operations have been performed.

- 1) Remove the masking tape, etc. from the supply and take-up end sensors.
- 2) Unplug the power lead from the AC outlet to reset the system control microprocessor.

Adjustment diagram



## MAINTENANCE/INSPECTION PROCEDURE




### 1. Required Maintenance

The recording density of a VTR is much higher than that of an audio tape recorder. VTR components must be very precise, at tolerances of 1/1000 mm, to ensure compatible with other VTRs. If any of these components are worn or dirty, the symptoms will be the same as if the part is defective. To ensure a good picture, periodic inspection and maintenance, including replacement of worn-out parts and lubrication, is necessary.

### 2. Scheduled Maintenance

Schedules for maintenance and inspection are not fixed because they are greatly according to the way in which the customer uses the VTR, and the environment in which the VTR is used. But, in general home use, a good picture will be maintained if the inspection and maintenance is done every 1,000 hours. The table below shows the relation between time used and inspection period.

Table 1

When inspection is necessary Average hours used per day	About 1 year	About 18 months	About 3 years
One hour			
Two hours			
Three hours			

### 3. Check before starting Repairs

The following faults can be remedied by cleaning and oiling. Check the need for lubrication and the conditions of cleanliness in the unit. Check with the customer to find out how often the unit is used. If from that you determine that the unit is ready for inspection and maintenance, check the following parts.

Table 2

Phenomenon	Inspection Location
Poor S/N, no colour	Dirt on video head or worn video head
Tape does not run or tape is slack	Dirt on pressure roller, reel belt or flywheel belt
Vertical jitter, horizontal jitter	Dirt on video head or in tape transport system
Colour beats	Dirt on full-erase head
Low volume or sound distorted	Dirt on audio/control head
Fast forward or rewind is not done or rotation is slow	Dirt on reel belt

### 4. Tools Needed for Inspection and Maintenance

- (1) Head cleaning kit
- (2) VTR oil kit
- (3) Alcohol (or freon)
- (4) Gauze
- (5) Screwdriver for adjusting X-value

Table 3 Locations for Greasing and Oiling using the Kit

Name	Oil or Greasing Location
Pan motor oil (X10W40)	Oil high-speed rotating sections
Sonic Slidas Oil (#1600)	Oil low-speed rotating sections
Hitazol (MO138)	Grease metal parts under heavy load
Froil (GB-TS-1)	Lubricate metal or molded sections under light load
Lock paint	Fix adjustment screws

The above oils and greases are in the kit prepared especially for VTR maintenance. Use this kit for lubrication.

## 5. Maintenance Procedures

### 5-1 Cleaning

#### (1) Cleaning video head

First use a cleaning tape. If dirt on head is too stubborn to remove by tape, use the cleaning kit. Moisten the cleaning stick with cleaning fluid at the point indicated. Touch the stick to the head tip and gently turn the head (rotating cylinder) to the right and left.

(Do not move the stick vertically and make sure that only the chamois leather on the stick comes into contact with the head. Otherwise, the head may be damaged.)

Thoroughly dry the head. Then test run a tape. If cleaning fluid remains on the video head, the tape may be damaged when it comes into contact with the head surface.

#### (2) Cleaning the tape transport system and drive system, etc.

Wipe with gauze moistened with alcohol or freon.

#### Notes:

- 1) The tape transport system is the system which comes into contact with the running tape. The drive system consists of those parts which run the tape.
- 2) Make sure that during cleaning you do not touch the tape transport system with the tip of a screwdriver and that no force is applied to the system that could deform it.

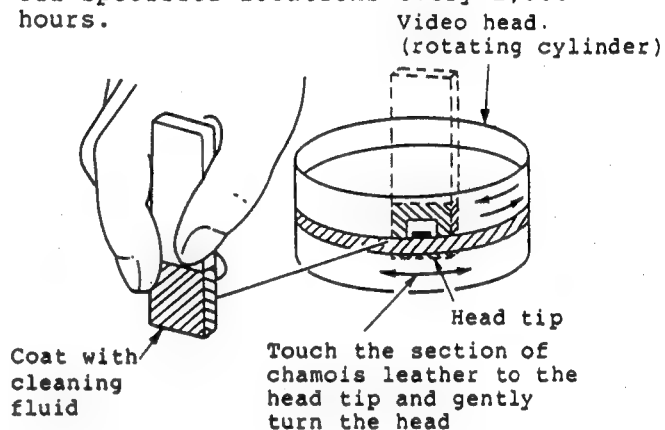
### 5-2 Lubrication

#### (1) Guidelines for lubricating with oil

Use the oiler to apply one or two drop of pan motor oil or Sonic Slidas oil. Make sure not to use too much oil because it may spill over or leak out coming into contact with rotating parts and causing slippage or other problems. If too much oil is applied, wipe clean with alcohol or freon.

#### (2) Periodic oil lubrication

Oil specified locations every 1,000 hours.



### 5-3 Greasing

#### (1) Greasing guidelines

Apply grease, Hitazol or Froil, with a stick or brush. Do not use excess grease. It may come into contact with the tape transport or drive system. Wipe any excess and clean with gauze moistened with alcohol or freon.

#### (2) Periodic greasing

Grease specified locations every 5,000 hours.

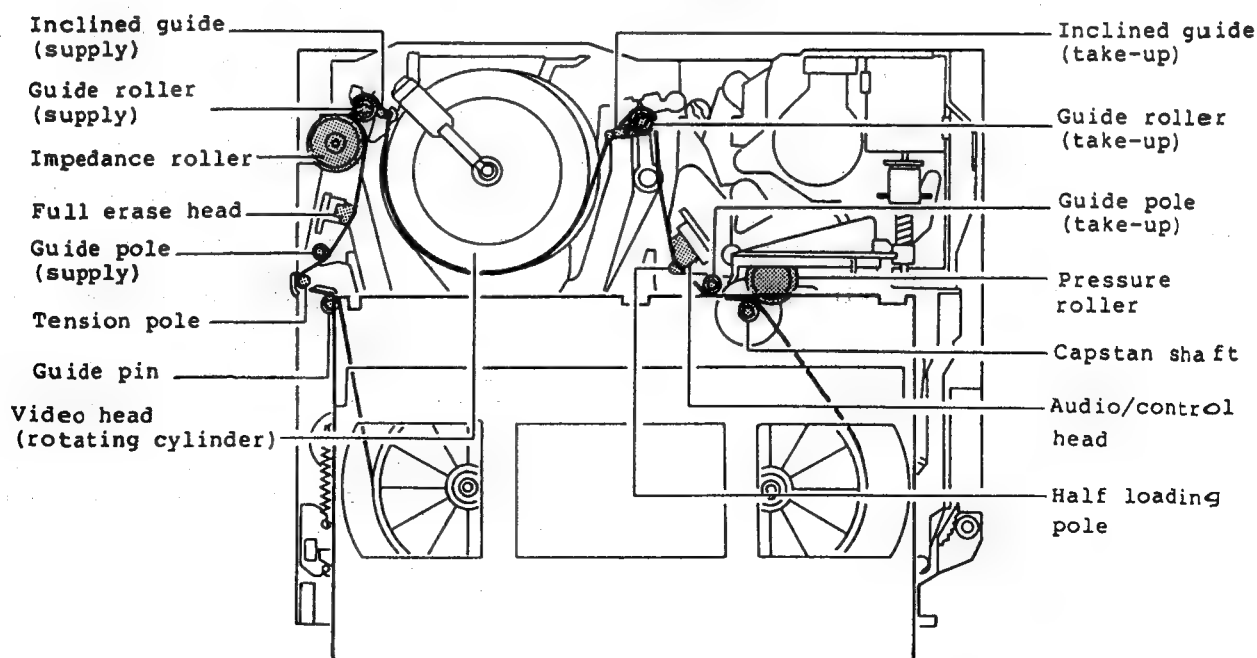


Fig. 1 Tape Transport System

## 6. Inspection Locations

Phenomenon	Inspection Location	Repla- cement
Colour beats	Dirt on full erase head	1
Poor S/N, no colour	Dirt on video heads	2
Vertical jitter	Dirt on video heads Dirt in tape transport system	3
Low volume, sound disordered	Dirt on audio/control head	4
Tape does not run. Tape is slack.	Dirt on pressure roller	5

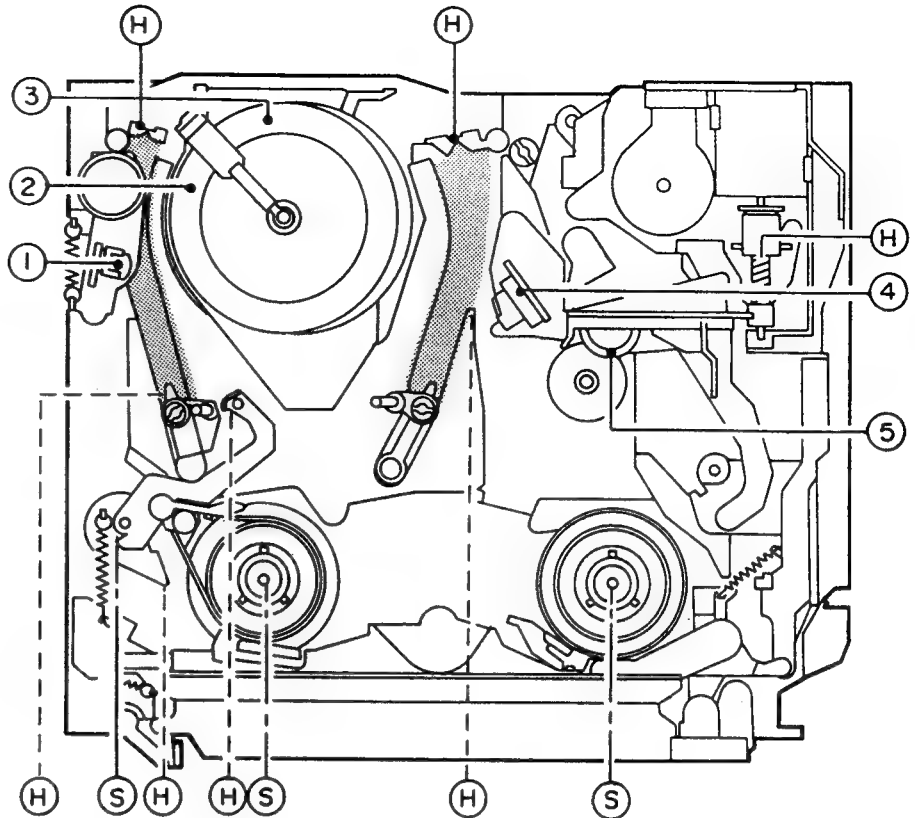


Fig. 2 Top View of Mechanism

Phenomenon	Inspection Location	Repla- cement
Does not fast fast forward, or rewind, or rotation is slow	Dirt on reel belt	○
Tape does not run		
Slack tape		

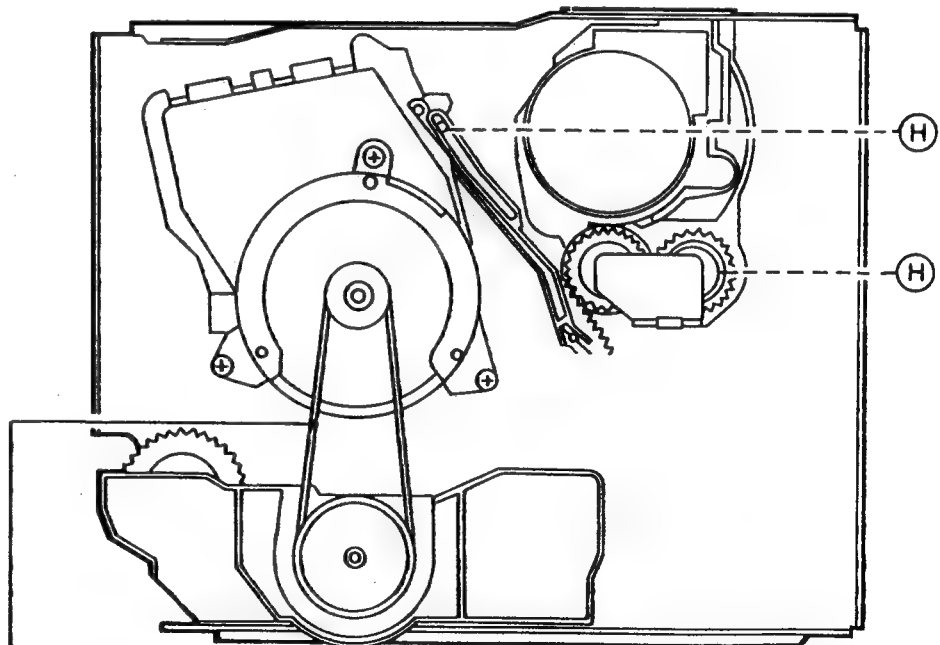


Fig. 3 Bottom View of Mechanism

### Note:

If locations marked with "o" do not operate normally after cleaning, they are worn. Replace.  
See the EXPLODED VIEWS at the end of this manual as well as the above illustrations for the sections to be lubricated and greased.

(S) : Sonic Slidas oil (oil locations)


(H) : Hitazol (grease locations)

## SCHEMATIC/CIRCUIT BOARD DIAGRAMS

## BEFORE USING THIS SERVICE REFERENCE MATERIAL

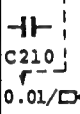
## How to read abbreviations

## (Resistors)

	Value	Not indicated .. $\Omega$ (ohm) K ..... k $\Omega$
	Tolerance	Not indicated .. +5% K ..... +10% M ..... +20%
	Wattage	Not indicated .. 1/8W (All values other than 1/8W are indicated in the schematic diagrams with W omitted)
	Sort	Not indicated .. Carbon film RC ..... Carbon solid RW ..... Wire wound RS ..... Metal oxide film RN ..... Metal film

Example: R120 ..... 150kohm, carbon solid  
RC1/2K 1/2W, +10%

## (Capacitors)

	Value	Not indicated .. $\mu$ F P ..... pF
	Dielectric strength	Not indicated .. 50WV (All values other than 50WV and electrolytic capacitors are indicated in the schematic diagrams with WV omitted)
	Tolerance	Not indicated .. +10% J ..... +5% M ..... +20% C ..... +0.25PF Z ..... +80% -20%
	Sort	Not indicated .. Ceramic General electrolytic (distinguished from ceramic with circuit symbol) MYL ..... Mylar (polyester film) STY ..... Styrol TA ..... Tantalum KU ..... High stability electrolytic MP ..... Metalized paper

Example: C210  
0.01/25 ... Mylar, 0.01 $\mu$ F, 25WV, +5%  
MYL J

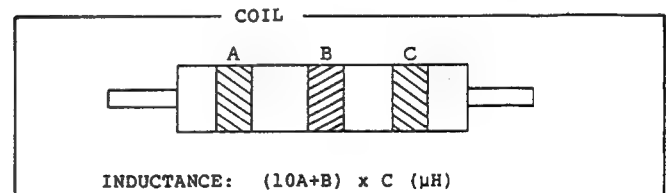
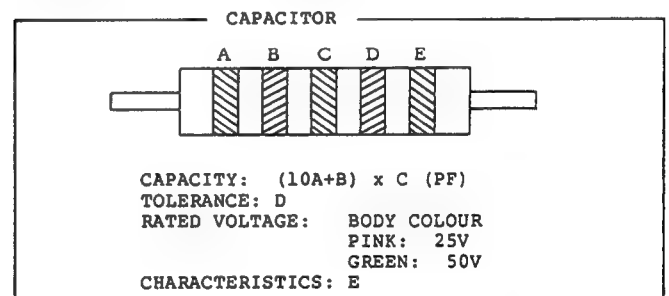
## Notes:

1. Voltages are measured with the negative  $\ominus$  terminal of the power supply as reference in the normal operating mode. The voltages in different modes are indicated in the schematic diagrams; those in parentheses ( ) are in the record mode and those without parentheses are in the play mode.
2. The value, dielectric strength (wattage), tolerance and sort of resistors (excluding variable resistors, etc.) and capacitors are indicated in the schematic diagrams by abbreviations. Replace them correctly, comparing the abbreviations in the schematic diagrams and the table "how to read abbreviations".

## Cautions on use of MOS IC

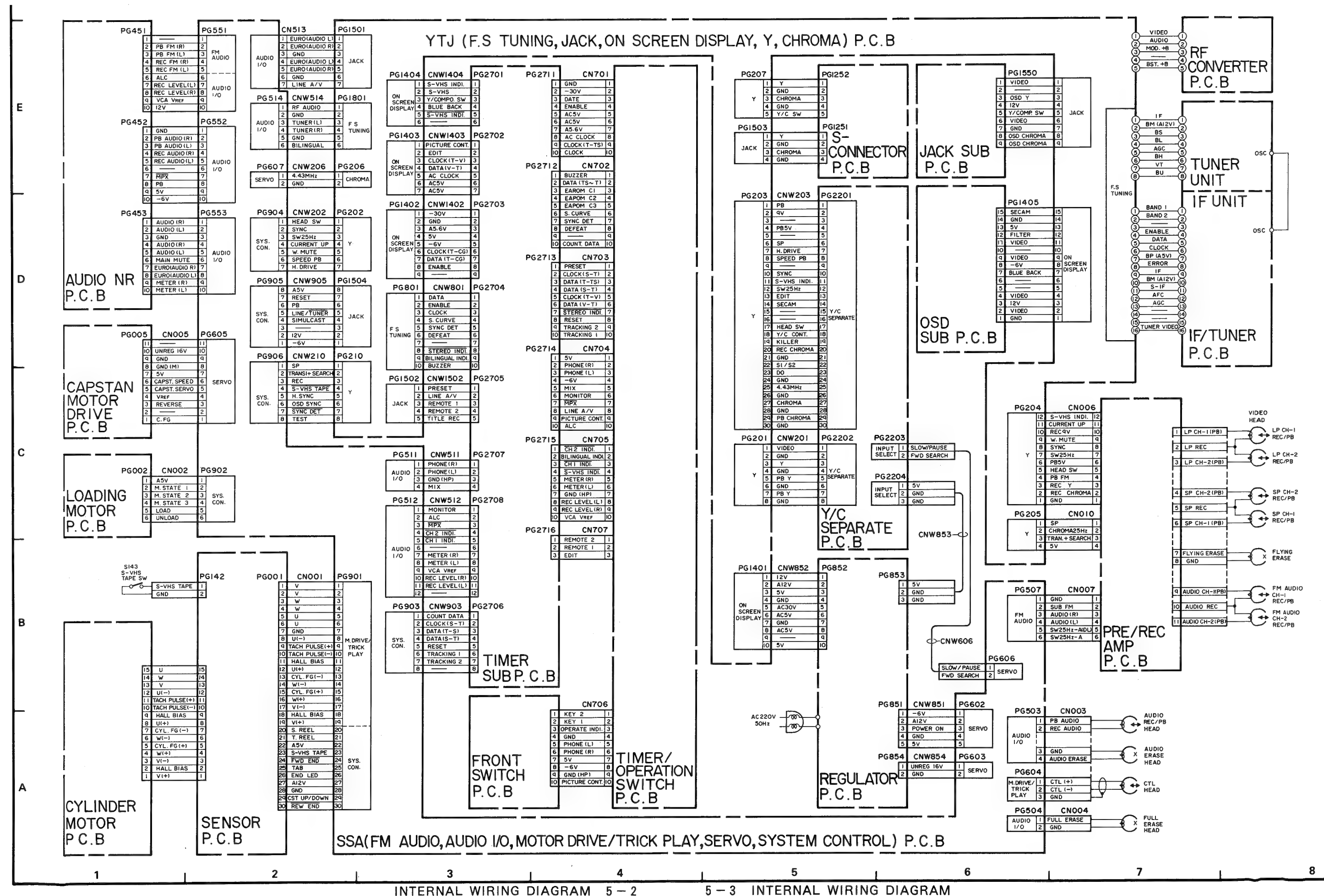
1. The MOS IC is inserted in black foam for shipment. This foam is a conductor which short-circuits between the leads to prevent damage. Do not remove ICs from this foam during their storage. Avoid removing ICs from this foam, placing them on plastic which is likely to be charged with static electricity or inserting them into styrol foam.
2. High voltages may be applied during soldering caused by leakages from the soldering iron, so be sure to ground the tip of the soldering iron or use a low voltage soldering iron.
3. The human body, clothes made of synthetic fibres or nylon gloves may be charged with several thousands volts of static electricity because of friction, so a worker should be earthed.
4. Be sure to earth measuring instruments such as oscilloscopes, VTVMs, etc. used for repairs.

## How to read capacity and inductance of resistor shape capacitors and coils



COLOUR	A, B	C	D	E
Black	0	$10^0$	+20%	For temperature compensation
Brown	1	$10^1$		
Red	2	$10^2$		
Orange	3	$10^3$		
Yellow	4	$10^4$		
Green	5	$10^5$		
Blue	6			
Violet	7			
Grey	8		+30%	High dielectric constant type
White	9			For temperature compensation
Gold		$10^{-1}$	+5%	
Silver		$10^{-2}$	+10%	High dielectric constant type

# INTERNAL WIRING DIAGRAM (KABELANSCHLUSSDIAGRAMM)





**DIAGRAM CONFIGURATION**

DIAGRAM CONFIGURATION	SCHEMATIC	CIRCUIT BOARD
TIMER SUB	5-4	5-6
FRONT SW	5-7	5-7
TIMER/OPERATION SW	5-8	5-10
JACK	5-12	5-24
JACK SUB	5-13	5-22
S-CONNECT(1/2)	5-13	5-24
ON SCREEN DISPLAY	5-14	5-24
OSD SUB	5-15	5-22
FS TUNING	5-16	5-24
PRE/REC AMP	5-17	-
Y	5-18	5-24
S-CONNECT(2/2)	5-18	5-24
CHROMA	5-20	5-24
Y/C SEPARATE	5-26	5-30
INPUT SELECT	5-29	5-30
AUDIO NR	5-32	5-34
FM AUDIO	5-35	5-46
AUDIO I/O	5-36	5-46
SERVO	5-38	5-46
MOTOR DRIVE/TRICK PLAY	5-40	5-46
CAPSTAN MOTOR DRIVE	5-40	-
SENSOR(2/2)	5-41	5-44
SYSTEM CONTROL	5-42	5-46
SENSOR(1/2)	5-43	5-44
REGULATOR	5-48	5-46
REG. IC	5-48	5-46
TUNER UNIT	5-50	-
IF UNIT	5-52	-
RF CONVERTER(For CT)	5-52	-
RF CONVERTER(For VPS)	5-54	-
REMOTE CONTROL	5-55	-

**VOLTAGE: STOP MODE**

**TIMER SUB P.C.B**

TIMER SUB		5 - 4	5 - 5	TIMER SUB
1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50
51	52	53	54	55
56	57	58	59	60
61	62	63	64	65
66	67	68	69	70
71	72	73	74	75
76	77	78	79	80
81	82	83	84	85
86	87	88	89	90
91	92	93	94	95
96	97	98	99	100

A vertical scale with five horizontal tick marks. The labels A, B, C, D, and E are positioned to the right of the scale, aligned with their respective tick marks from bottom to top.



\* VOLTAGE: STOP MODE

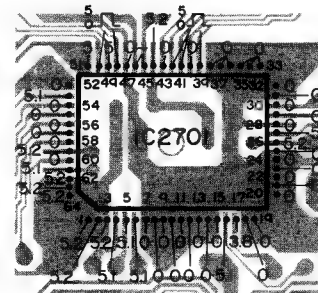


DIAGRAM CONFIGURATION	SCHEMATIC	CIRCUIT BOARD
TIMER SUB	5-4	5-6
FRONT SW	7	5-7
POWER/OPERATION SW	5-8	5-10
JACK	5-12	5-24
JACK SUB	5-13	5-22
S-CONNECT(1/2)	5-13	6-34
ON SCREEN DISPLAY	5-14	5-24
OSD	5-15	5-24
RF TUNING	5-16	5-24
PRE/REC AMP	5-17	-
Y	5-18	5-24
S-CONNECT(2/2)	5-18	5-34
CHROMA	5-20	5-24
Y/C SEPARATE	5-21	5-30
INPUT SELECT	5-29	5-30
AUDIO NR	5-32	5-34
FM AUDIO	5-35	5-48
AUDIO I/O	5-36	5-48
SERVO	5-38	5-48
MOTOR DRIVE/TRICK PLAY	5-40	5-48
CAPSTAN MOTOR DRIVE	5-41	5-48
SENSOR(2)	5-41	5-44
SYSTEM CONTROL	5-42	5-48
SENSOR(1/2)	5-43	5-44
REGULATOR	5-48	5-48
REL IC	5-48	5-48
TUNER UNIT	5-50	-
IF UNIT	5-51	-
RF CONVERTER(For CT)	5-53	-
RF CONVERTER(For VPS)	5-54	-
REMOTE CONTROL	5-55	-

To  
TIMER/OPERATION SWITCH  
CN706

10 9 8 7 6 5 4 3 2 1

R750

IC771

OPERATE

J701  
HEAD  
PHONE  
JACK

TO  
CHASSIS  
GROUND

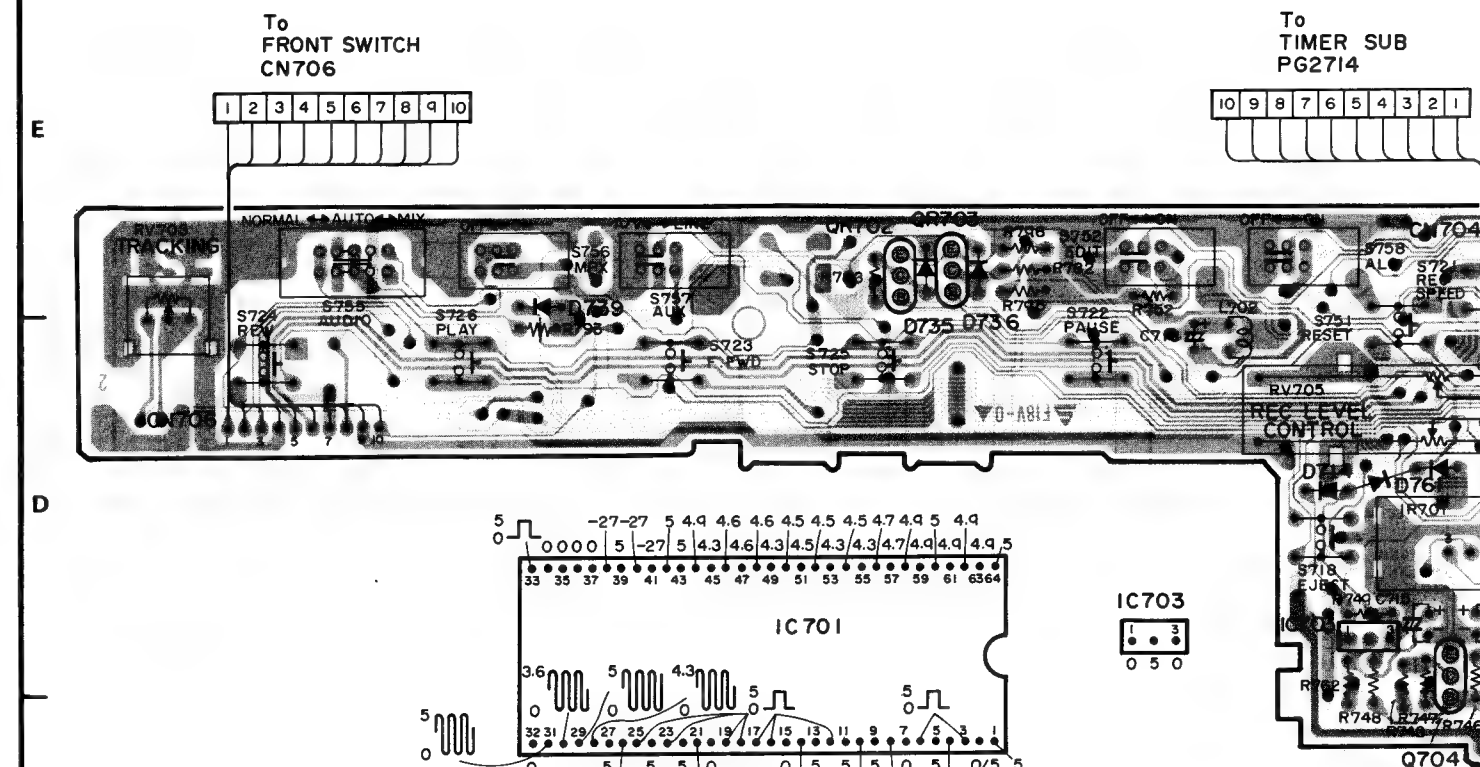
FRONT SWITCH P.C.B

● : Through Hole

\* ONE VOLTAGE : PB OR REC MODE  
TWO VOLTAGES : PB AND (REC) MODE

TIMER/OPERATION SWITCH P. C. B

# TIMER/OPERATION SWITCH CIRCUIT BOARD DIAGRAM (TIMER/FUNKTIONSSCHALTER)



\* VOLTAGE: STOP MODE.

# TIMER/OPERATION SWITCH SCHEMATIC DIAGRAM (OPERATION SWITCH SECTION) (TIMER-FUNKTIONSSCHALTER) (FUNKTIONSSCHALTER)

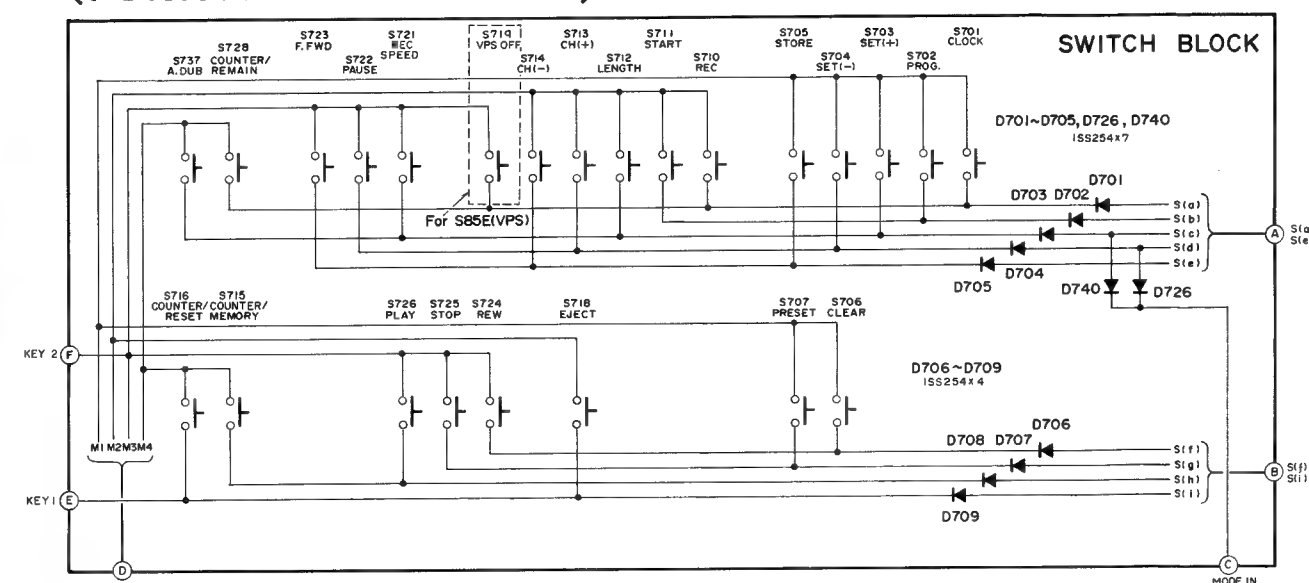
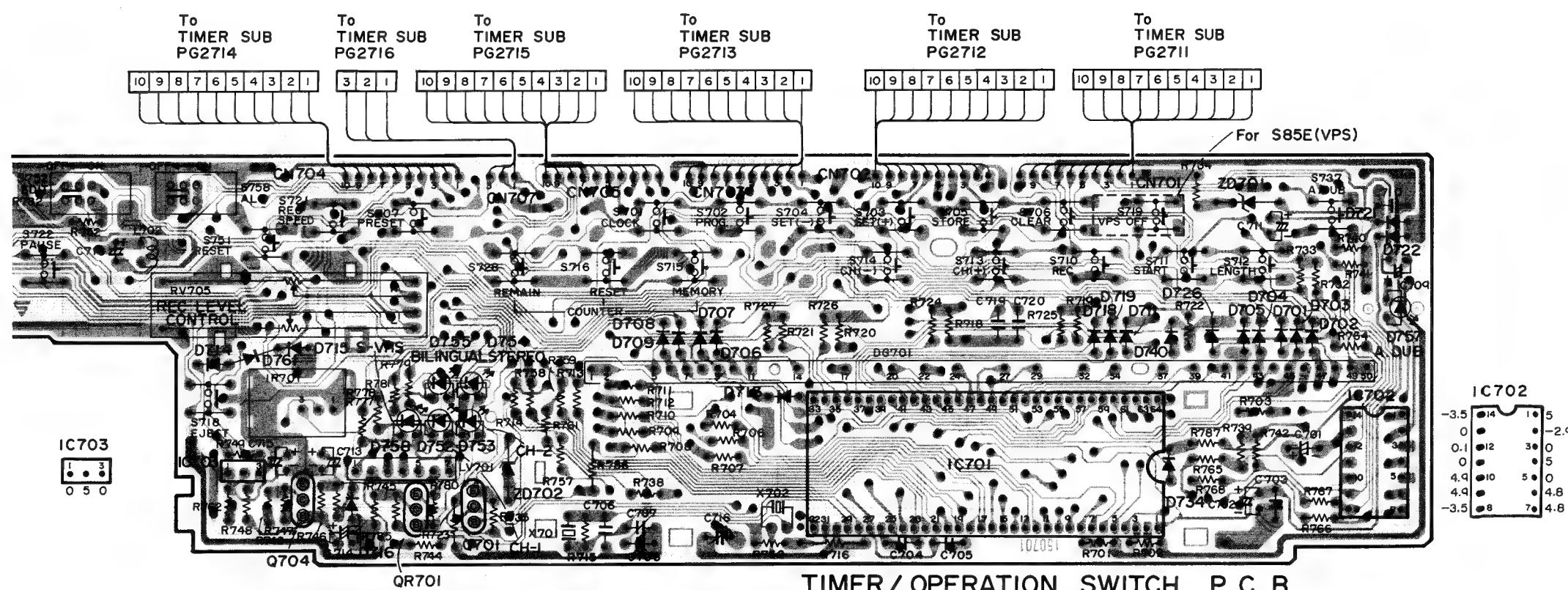


DIAGRAM CONFIGURATION	SCHEMATIC	CIRCUIT BOARD
TIMER SUB	5-4	5-8
FRONT SW	5-7	5-7
TIMER/OPERATION SW	5-8	5-10
JACK	5-12	5-24
JACK SUB	5-13	5-22
S-CONNECT(1/2)	5-13	5-34
ON SCREEN DISPLAY	5-14	5-24
OSD SUB	5-15	5-22
FS TUNING	5-16	5-24
PRE/REC AMP	5-17	-
Y	5-18	5-24
S-CONNECT(2/2)	5-18	5-34
CHROMA	5-20	5-24
Y/C SEPARATE	5-28	5-30
INPUT SELECT	5-29	5-30
AUDIO NR	5-32	5-34
FM AUDIO	5-35	5-48
AUDIO I/O	5-36	5-48
SERVO	5-38	5-48
MOTOR DRIVE/TRICK PLAY	5-40	5-48
CAPSTAN MOTOR DRIVE	5-40	-
SENSOR(2/2)	5-41	5-44
SYSTEM CONTROL	5-42	5-48
SENSOR(1/2)	5-43	5-44
REGULATOR	5-48	5-48
REG. IC	5-48	5-48
TUNER UNIT	5-50	-
IF UNIT	5-52	-
RF CONVERTER(For CT)	5-53	-
RF CONVERTER(For VPS)	5-54	-
REMOTE CONTROL	5-55	-

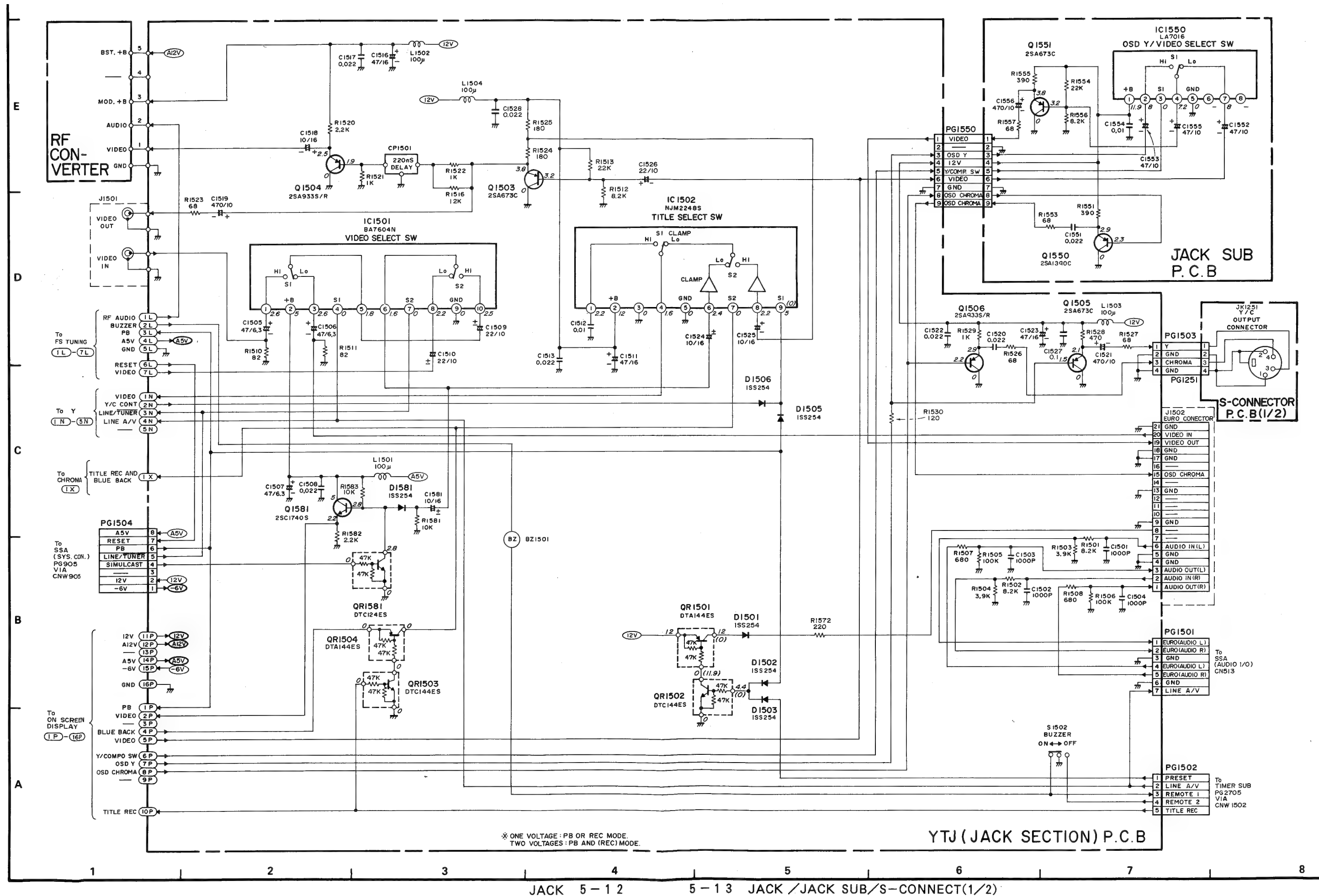


\* VOLTAGE: STOP MODE. Component Side Solder Side Through Hole

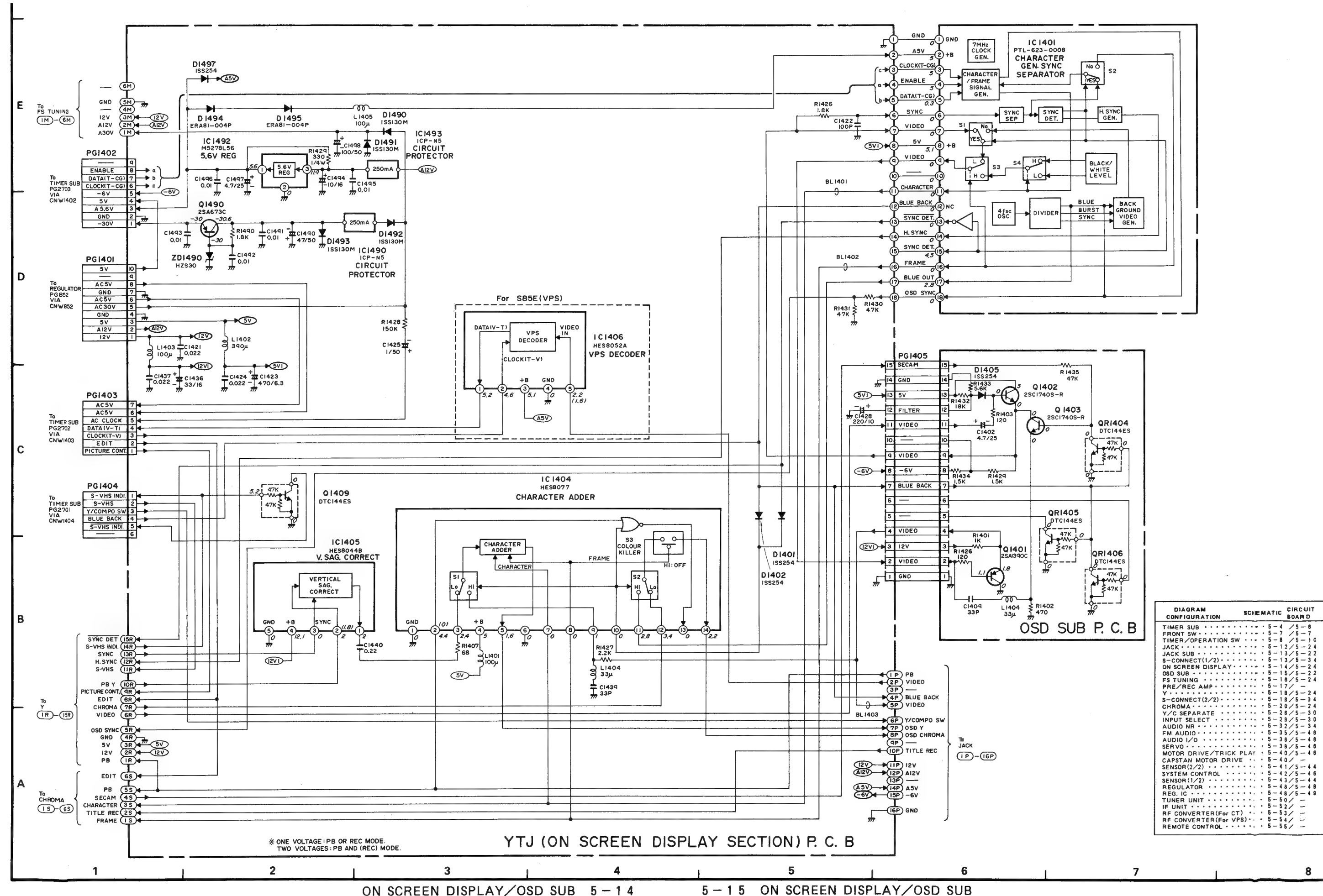
TIMER/OPERATION SWITCH P.C.B



# JACK/JACK SUB/S-CONNECT(1/2) SCHEMATIC DIAGRAM (BUCHSE/BUCHSE-HILFS/S-STECKER 1/2)



# ON SCREEN DISPLAY/OSD SUB SCHEMATIC DIAGRAM (BILDSCHIRMA-ANZEIGE(OSD)/OSD-HILFS)



## FS TUNING SCHEMATIC DIAGRAM

## PRE/REC AMP SCHEMATIC DIAGRAM (AUFNAHME-VORVERSTÄRKER)

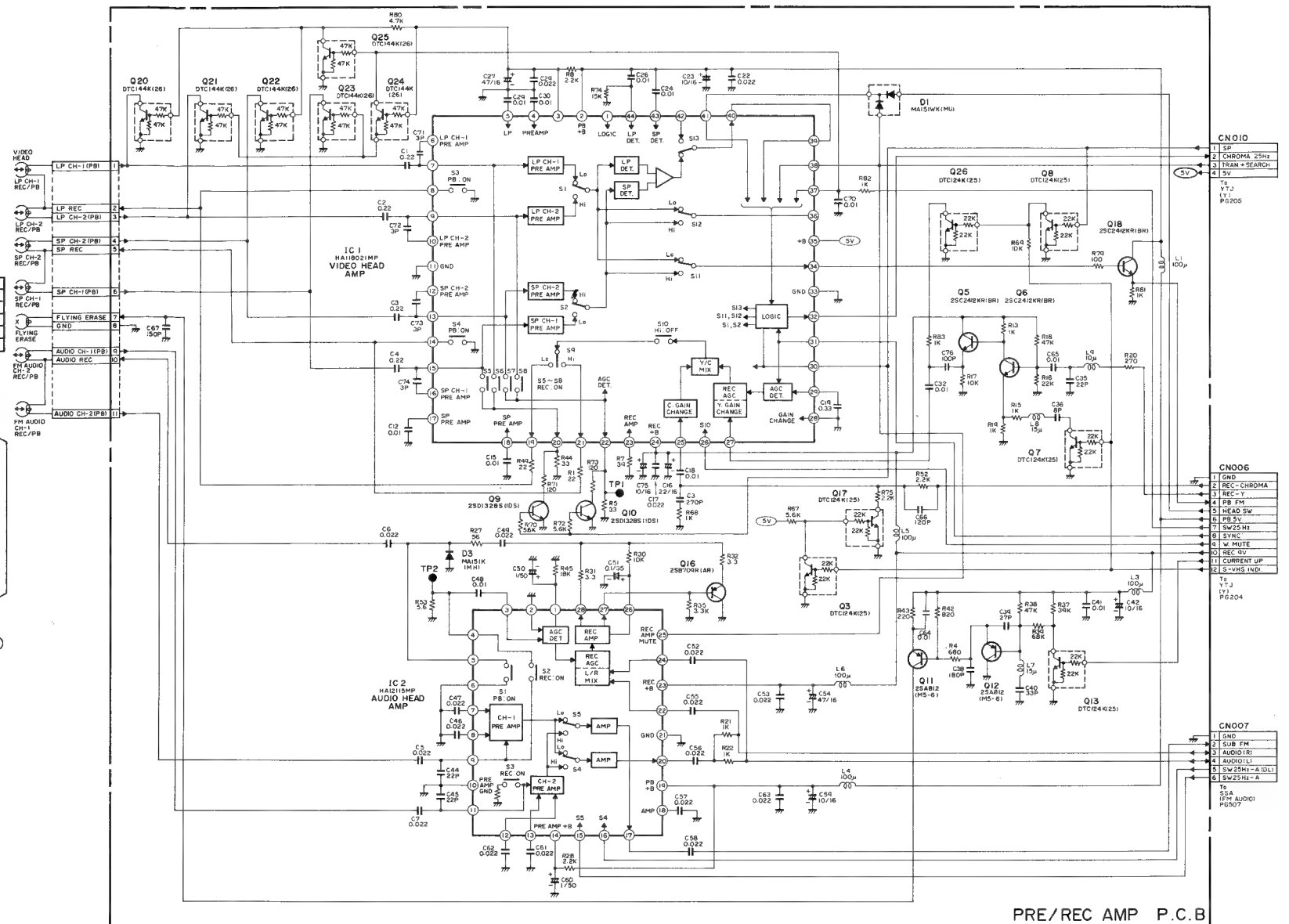
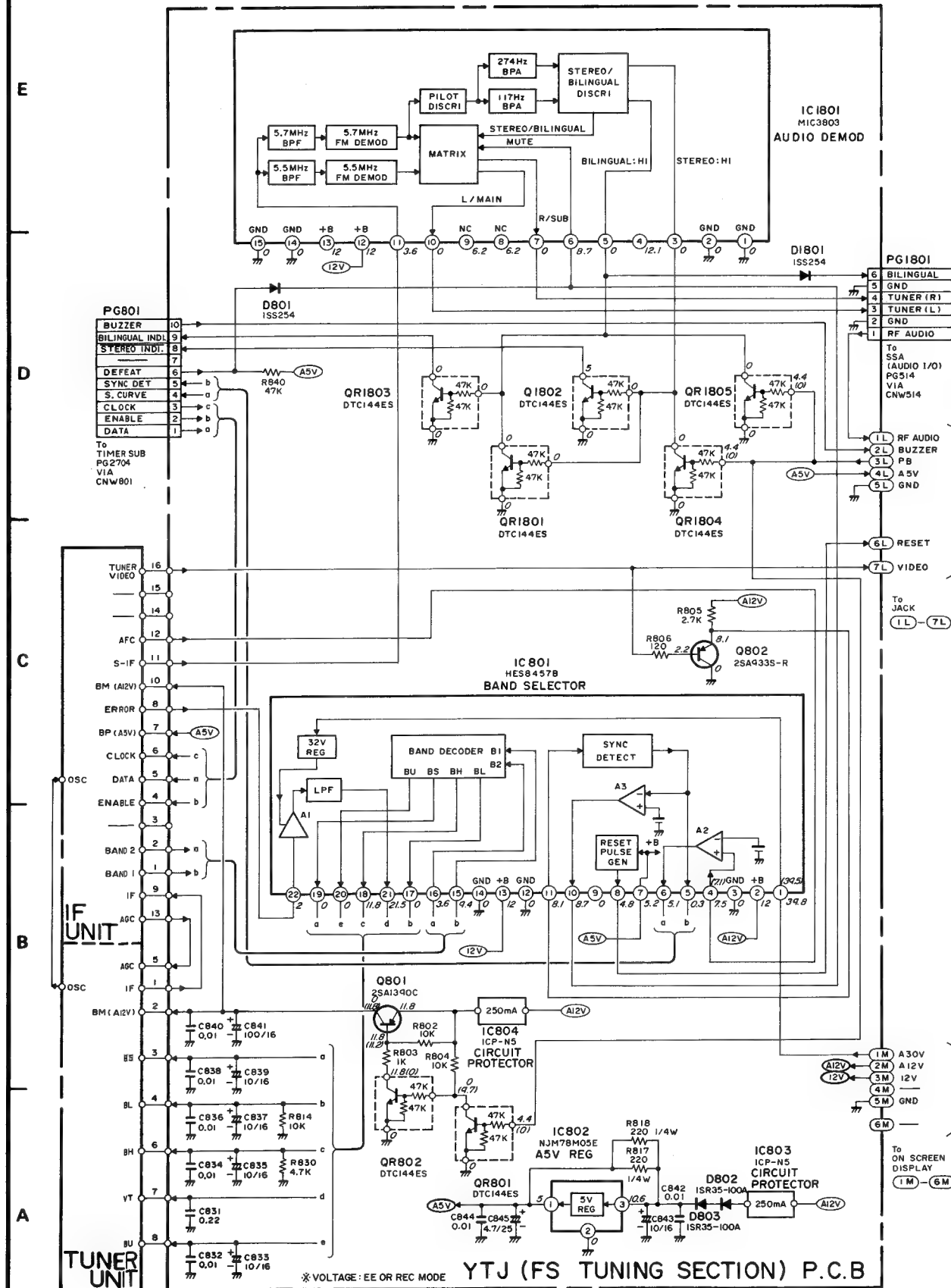
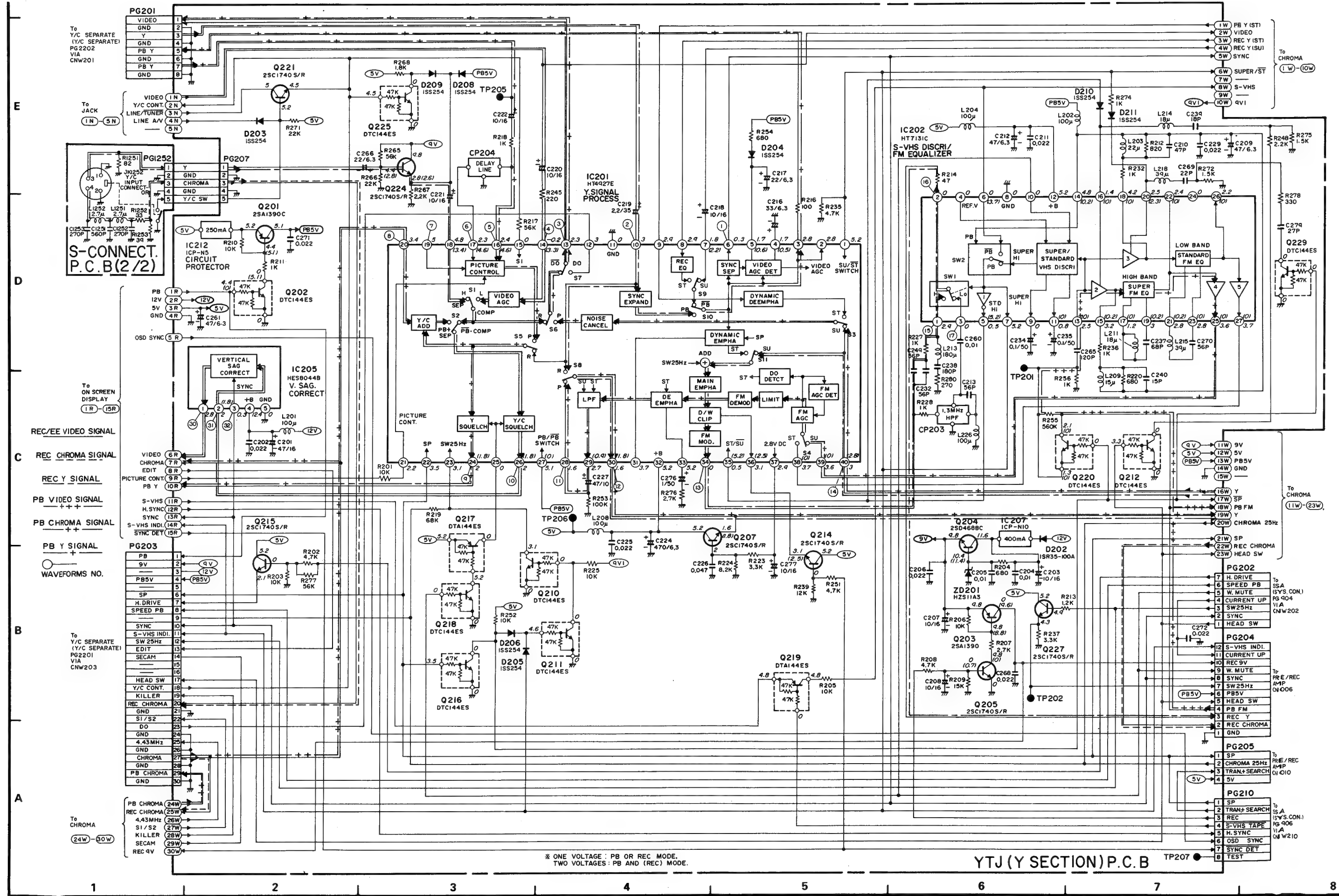


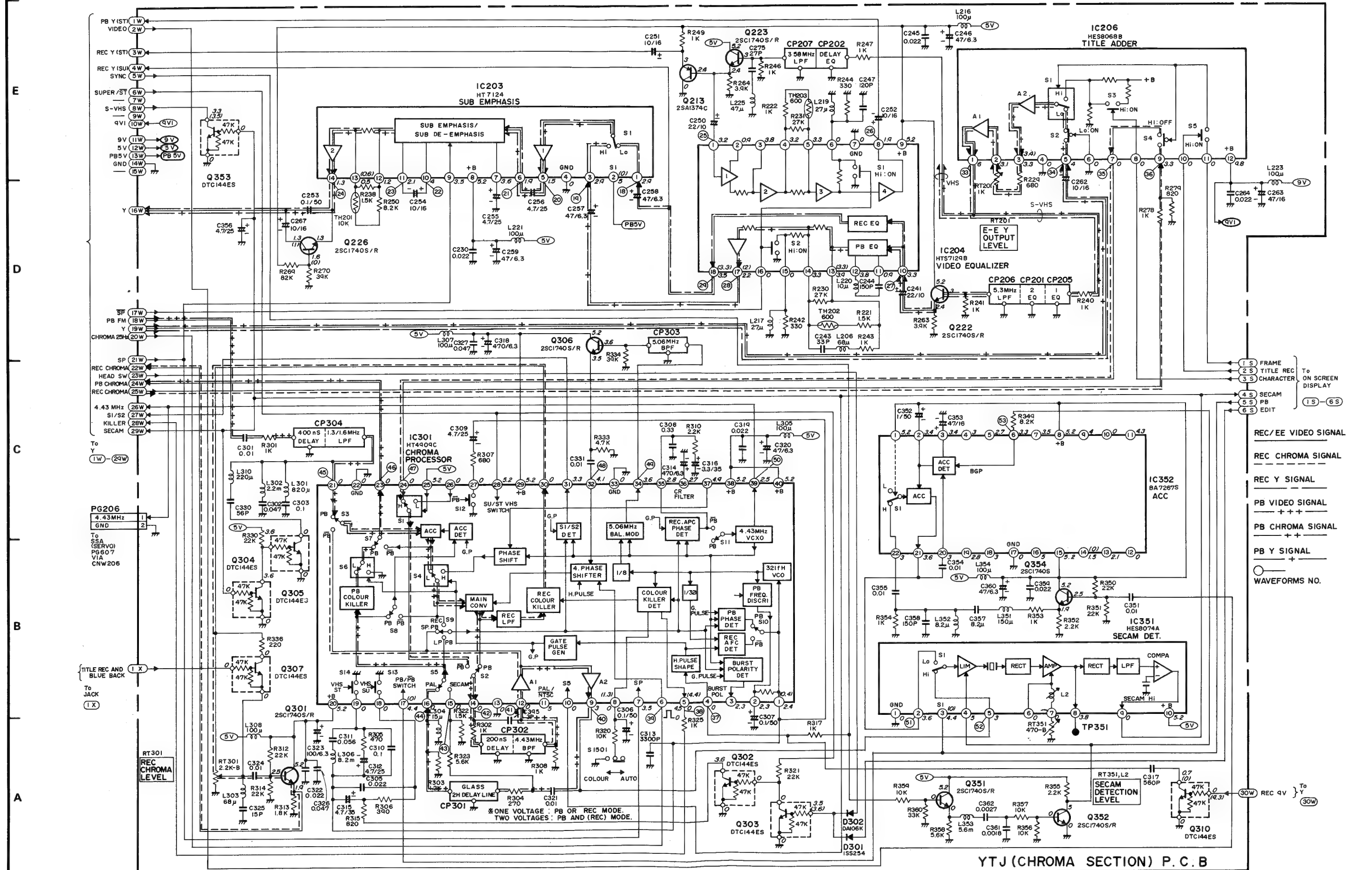
DIAGRAM CONFIGURATION	SCHEMATIC	CIRCUIT BOARD
TIMER SUB . . . . .	5-4	5-6
FRONT SW . . . . .	5-7	5-7
TIMER/OPERATION SW . . . . .	5-8	5-10
JACK . . . . .	5-12	3-24
JACK SUB . . . . .	5-13	5-22
S-CONNECT(1/2) . . . . .	5-13	5-34
ON SCREEN DISPLAY . . . . .	5-14	5-24
OSD SUB . . . . .	5-15	5-22
FS TUNING . . . . .	5-16	5-24
PRE/REC AMP . . . . .	5-17	5-34
Y . . . . .	5-18	5-24
S-CONNECT(2/2) . . . . .	5-18	/
CHROMA . . . . .	5-20	5-24
V/C/MPARATE . . . . .	5-20	5-30
INPUT SELECT . . . . .	5-29	5-30
AUDIO NR . . . . .	5-32	5-34
FM AUDIO . . . . .	5-35	5-46
AUDIO I/O . . . . .	5-38	5-46
SERVO . . . . .	5-38	5-46
MOTOR DRIVE/TRICK PLAY . . . . .	5-40	5-46
CAPSTAN MOTOR DRIVE . . . . .	5-40	-
SENSOR(2/2) . . . . .	5-41	5-44
SYSTEM CONTROL . . . . .	5-42	5-46
SENSOR(1/2) . . . . .	5-43	5-44
REGULATOR . . . . .	5-48	5-46
REG IC . . . . .	5-48	5-49
TUNING UNIT . . . . .	5-50	-
IF UNIT . . . . .	5-52	-
RF CONVERTER(For CT) . . . . .	5-53	-
RF CONVERTER(For VPS) . . . . .	5-54	-
REMOTE CONTROL . . . . .	5-55	-

# Y/S-CONNECT(2/2) SCHEMATIC DIAGRAM (LUMINANZ/S-STECKER 2/2)



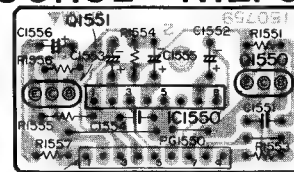


# CHROMA SCHEMATIC DIAGRAM (CHROMINANZ)



## OSD SUB CIRCUIT BOARD I DIAGRAM (OSD-HILFS)

## JACK SUB CIRCUIT BOARD DIAGRAM (BUCHSE—HILFS)



To  
YTJ  
PG/550

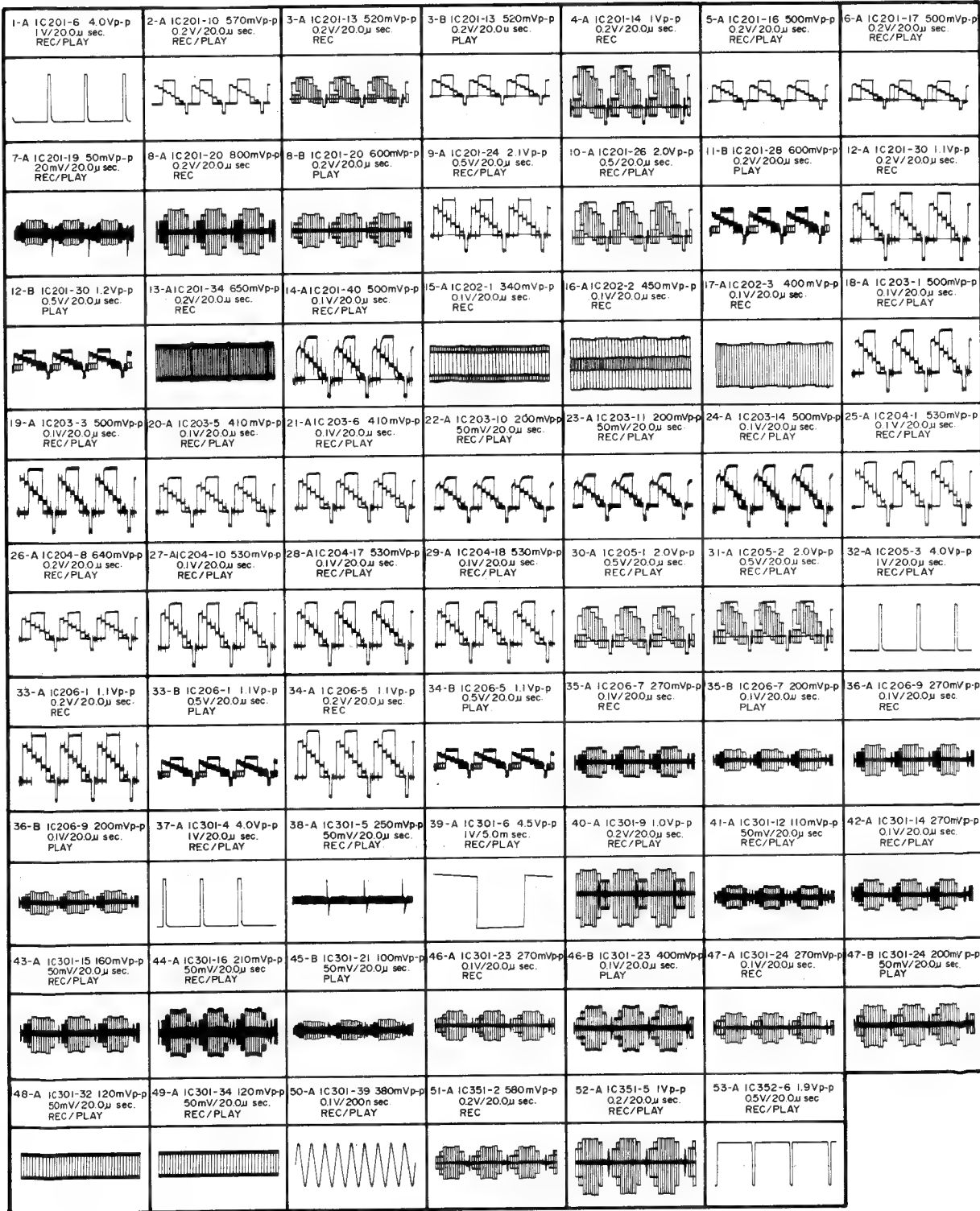
JACK SUB P.C.B

OSD SUB P.C.B Y/CHROMA WAVEFORMS  
(LUMINANZ/CHROMINANZ - WELLENFORMEN)

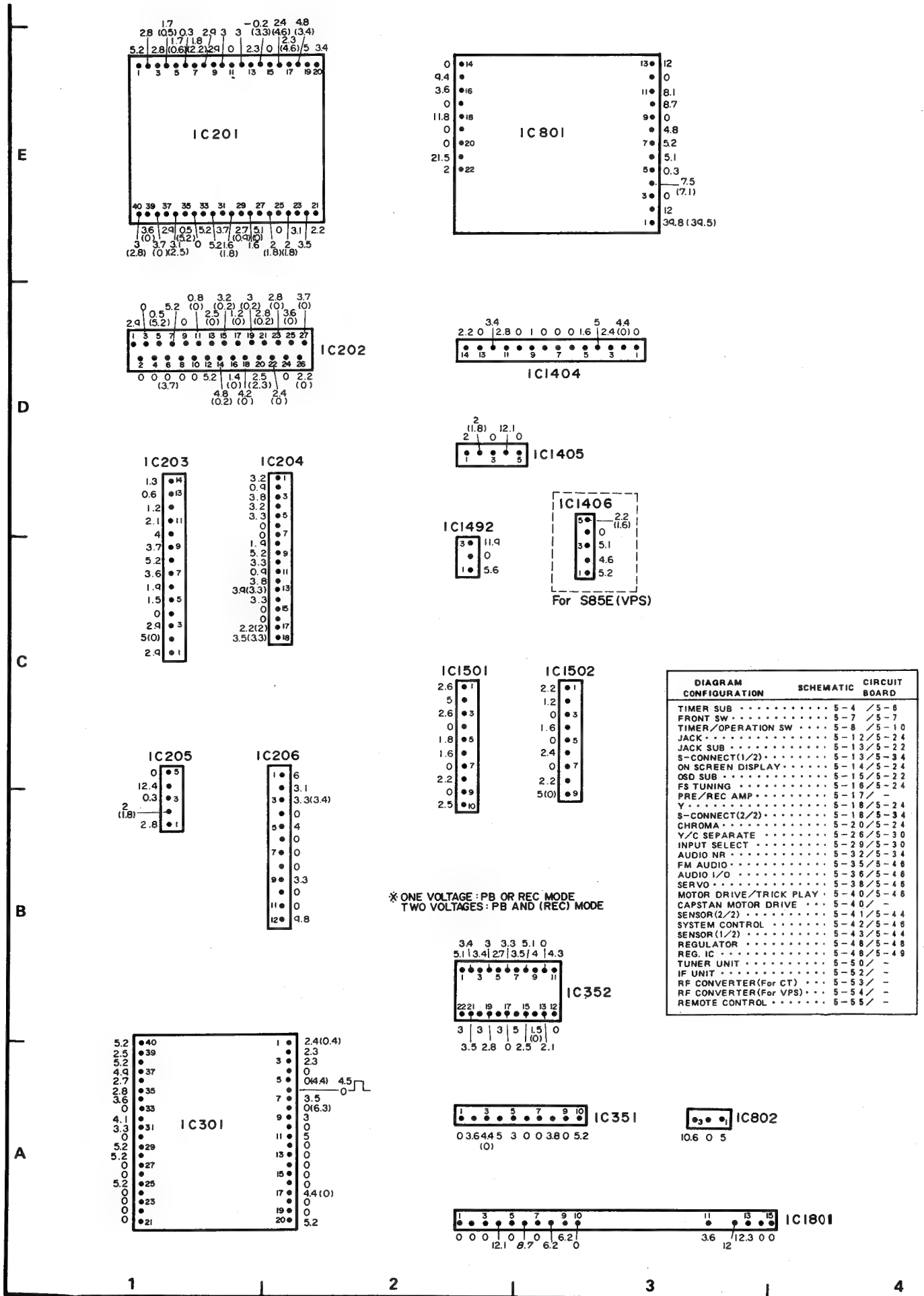
Hinweis: Die folgenden Meßbedingungen einhalten.

Aufnahme: Farbbalken, lvs-s an Video-Eingangsbuchse.

Wiedergabe: Abgleichband (Farbbalkenabschnitt) verwenden.



# YTJ CIRCUIT BOARD DIAGRAM (YTJ)

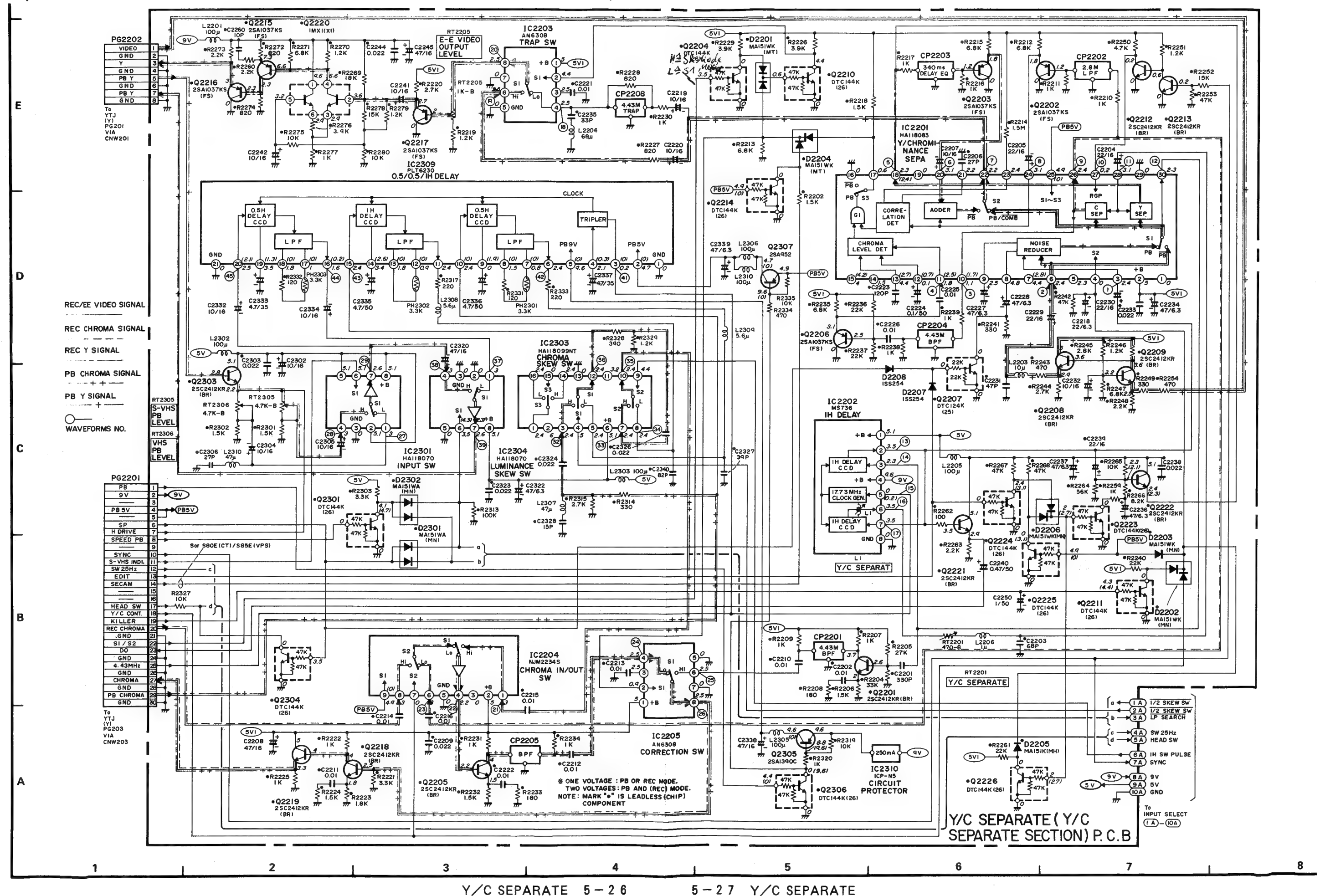








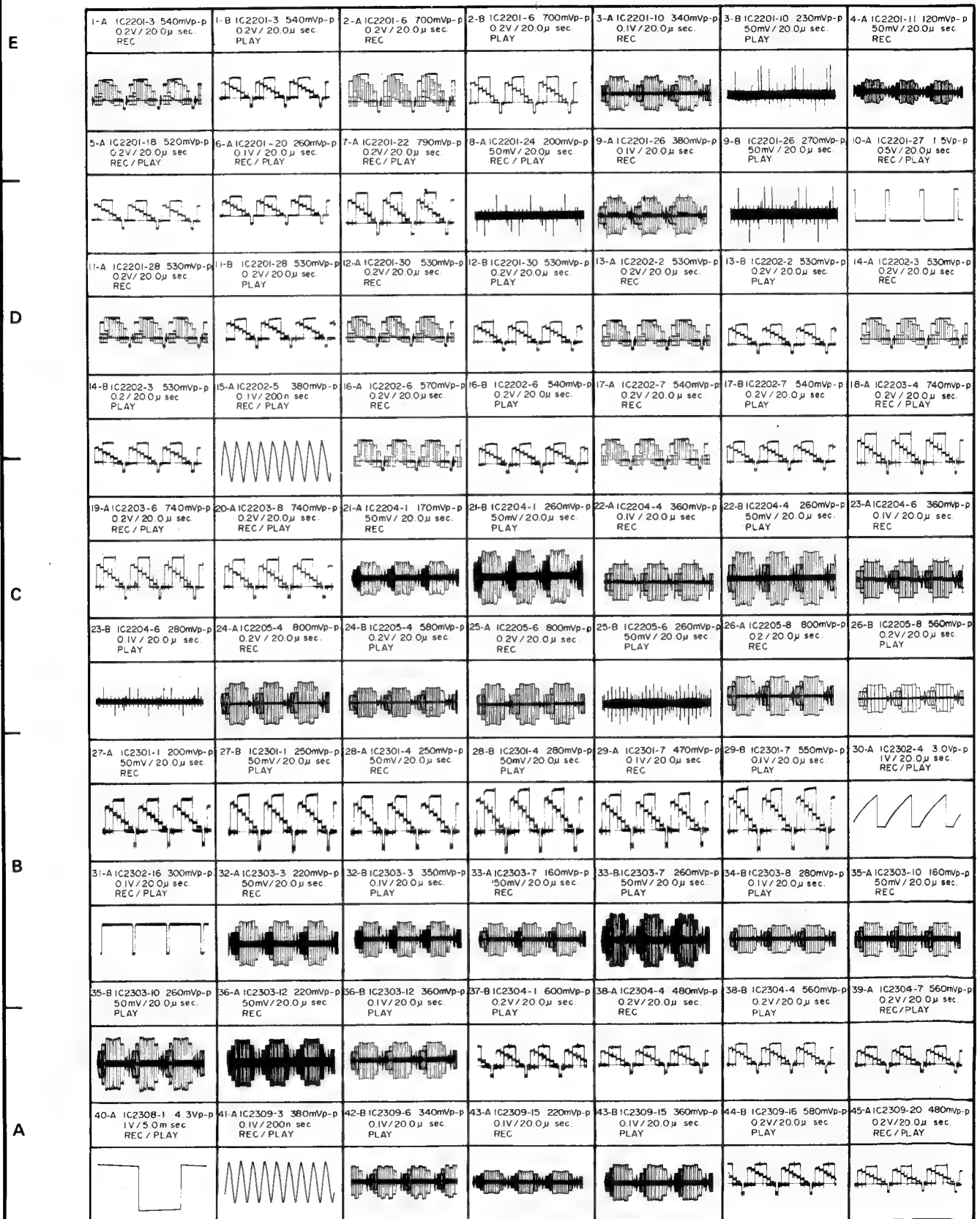
# Y/C SEPARATE SCHEMATIC DIAGRAM (Y/C-SEPARATOR)



# Y/C SEPARATE WAVEFORMS (Y/C-SEPARATOR-WELLENFORMEN)

Note: Measurement conditions are as follow.  
REC: Colour bars, 1Vp-p at video input jack.  
PLAY: Using a S-VHS blank tape, make a  
SP recording and playback.

Hinweis: Die folgenden Meßbedingungen einhalten.  
Aufnahme: Farbbalken, 1Vs an Video-Eingangsbuchse.  
Wiedergabe: Eine S-VHS Leer-Kassette verwenden,  
eine SP-Aufnahme ausführen und  
diese wiedergeben.



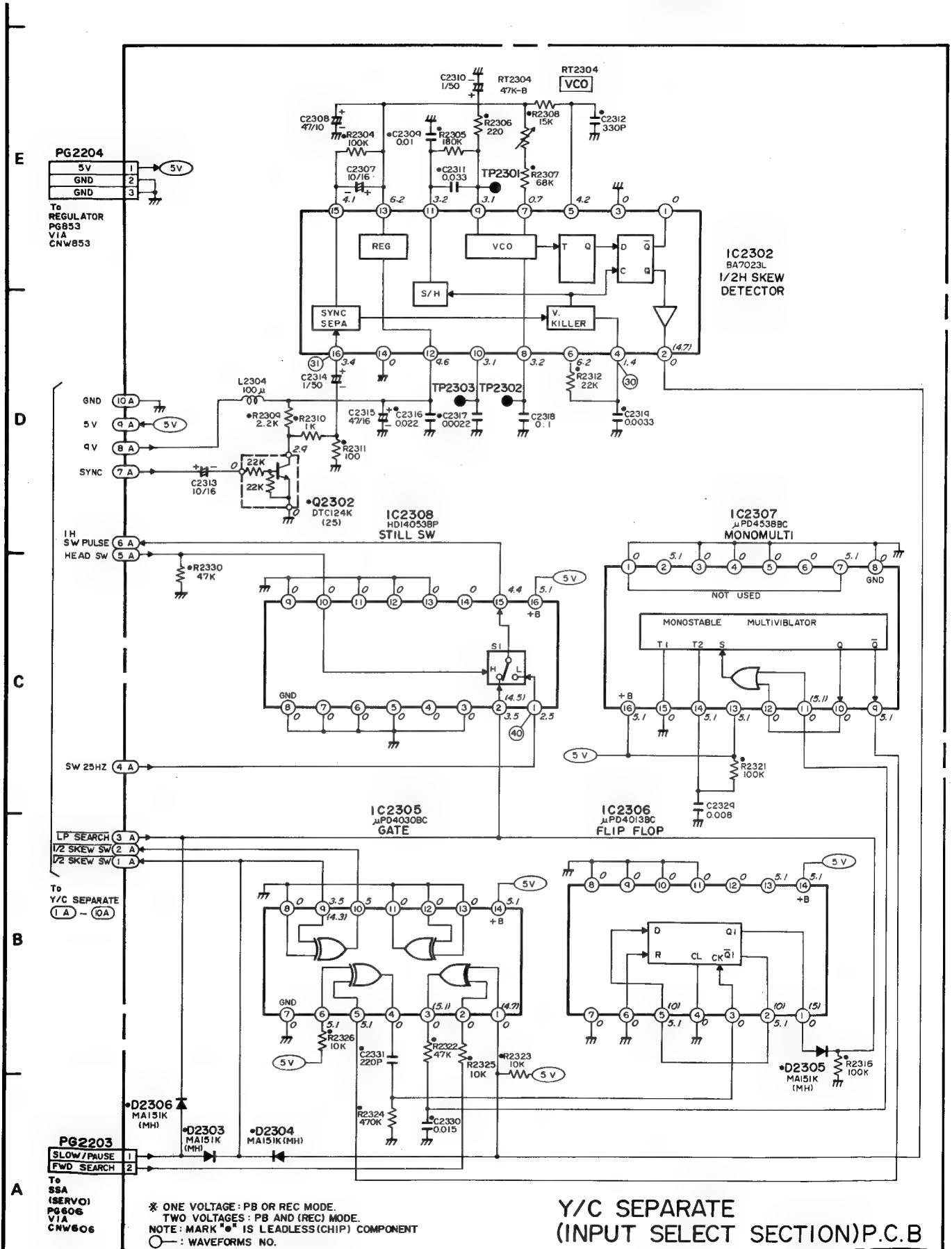
1

2

3

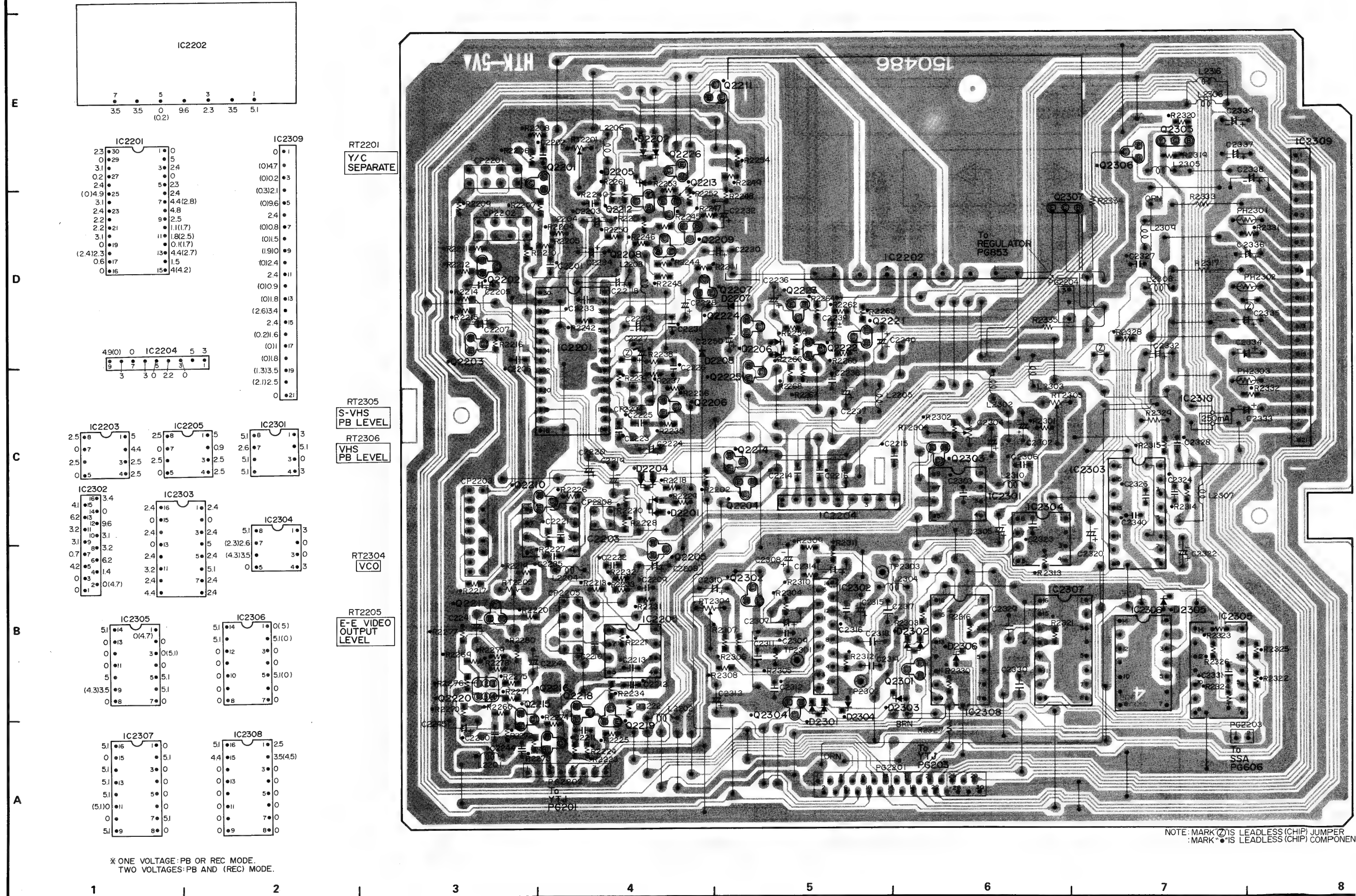
4

# INPUT SELECT SCHEMATIC DIAGRAM (EINGANGSSCHALTER)





# Y/C SEPARATE CIRCUIT BOARD DIAGRAM (Y/C-SEPARATOR)



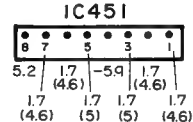
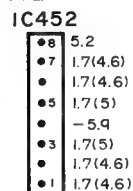


**LA**

A vertical scale with five horizontal tick marks. The marks are labeled A, B, C, D, and E from bottom to top.



IC452



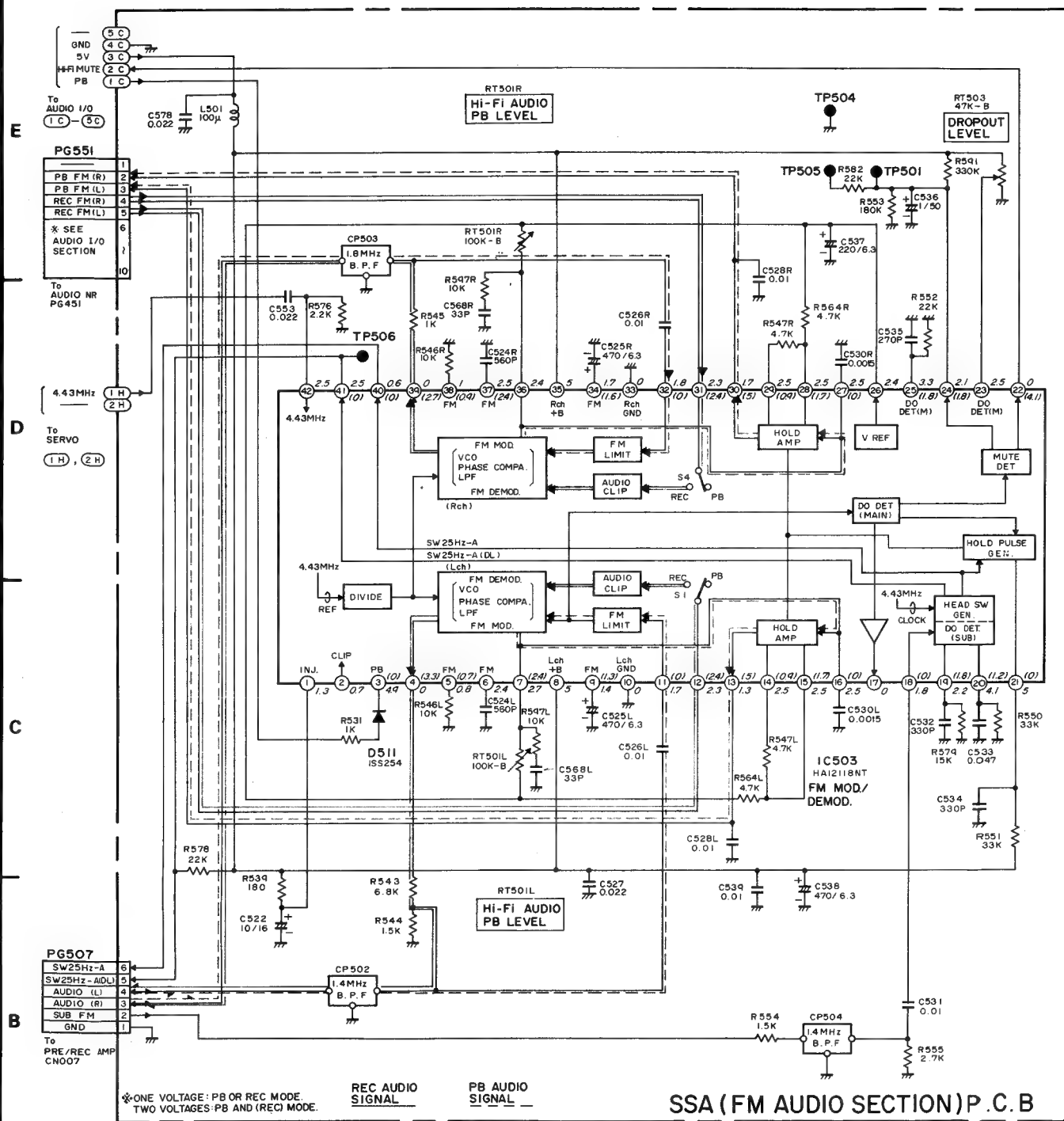
\* ONE VOLTAGE : PB OR REC MODE.  
TWO VOLTAGES : PB AND (REC) MODE.

## C

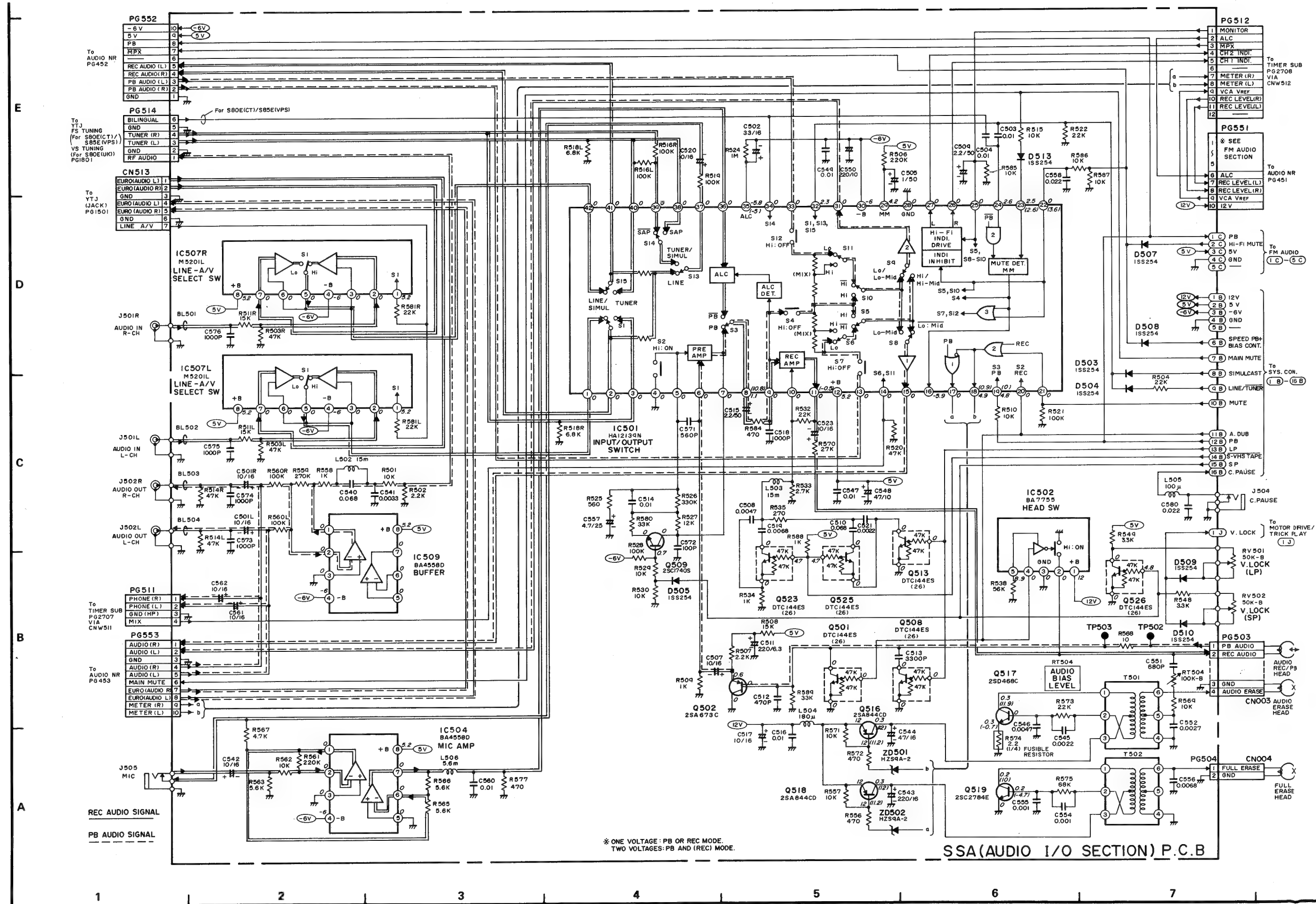


A

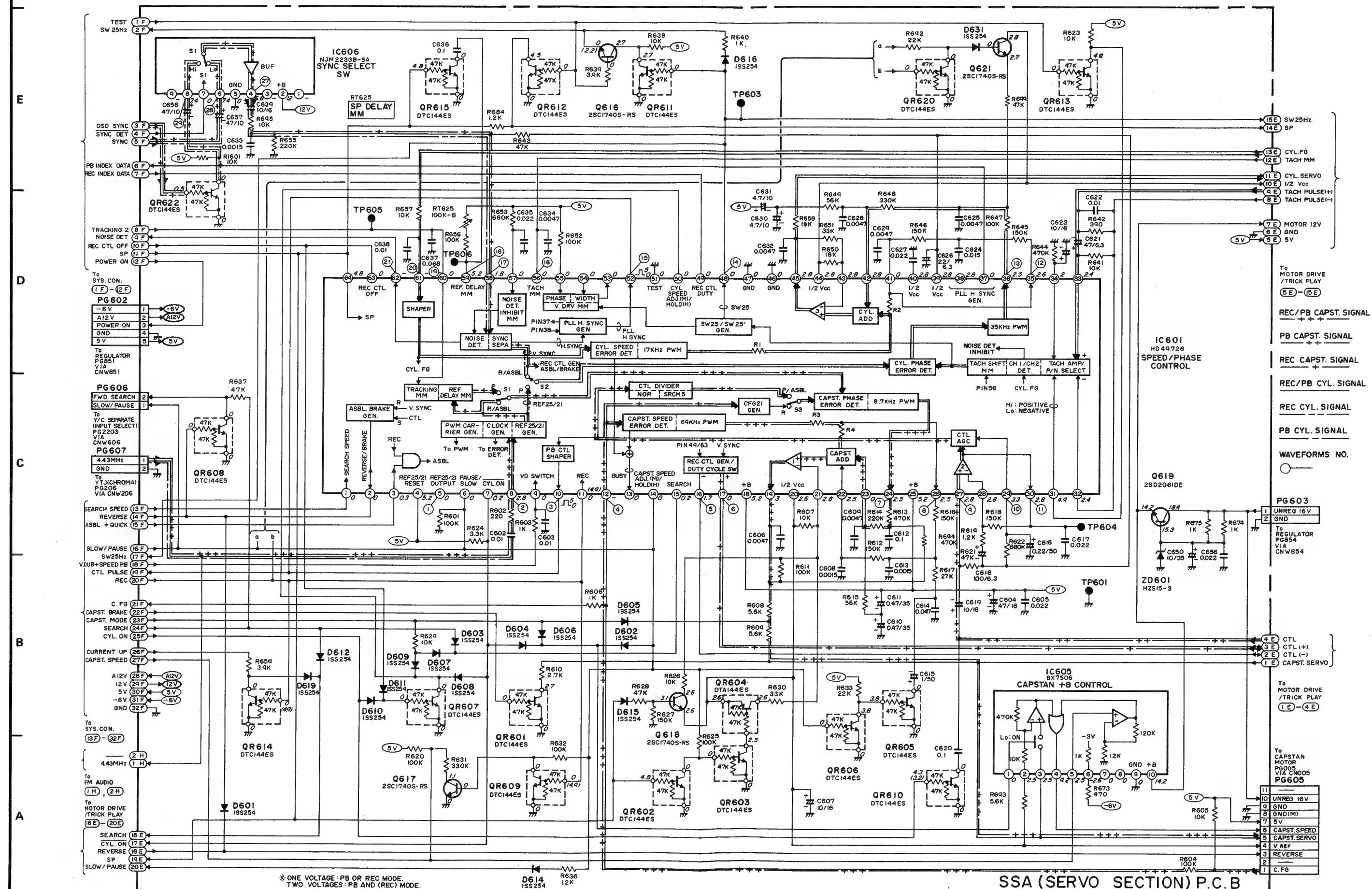
# FM AUDIO SCHEMATIC DIAGRAM (FM AUDIO)



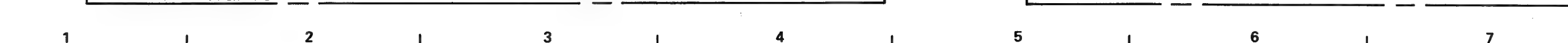
# AUDIO I/O SCHEMATIC DIAGRAM (AUDIO EINGANG/AUSGANG)



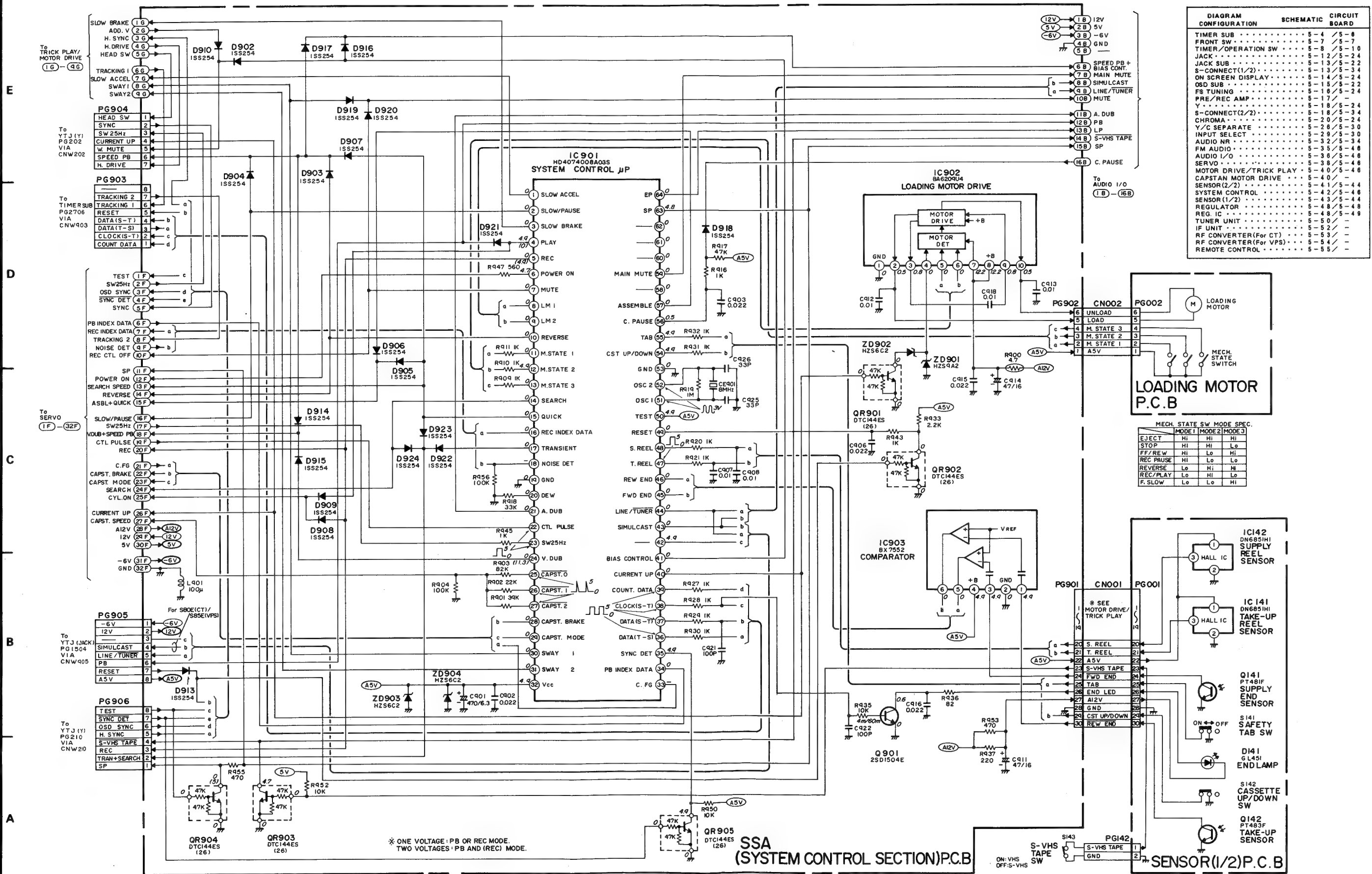
# SERVO SCHEMATIC DIAGRAM (SERVO)



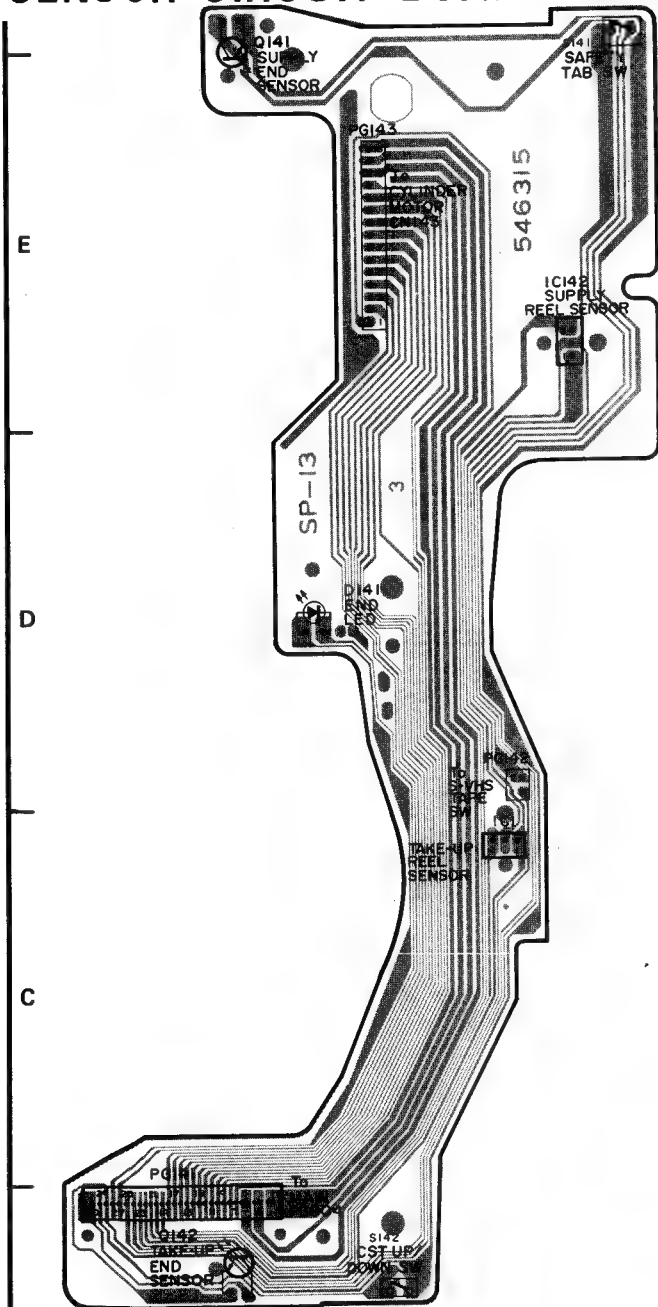




SYSTEM CONTROL/SENSOR(1/2) SCHEMATIC DIAGRAM (SYSTEMREGELUNG/SENSOR 1/2)



# SENSOR CIRCUIT BOARD DIAGRAM (SENSOR)



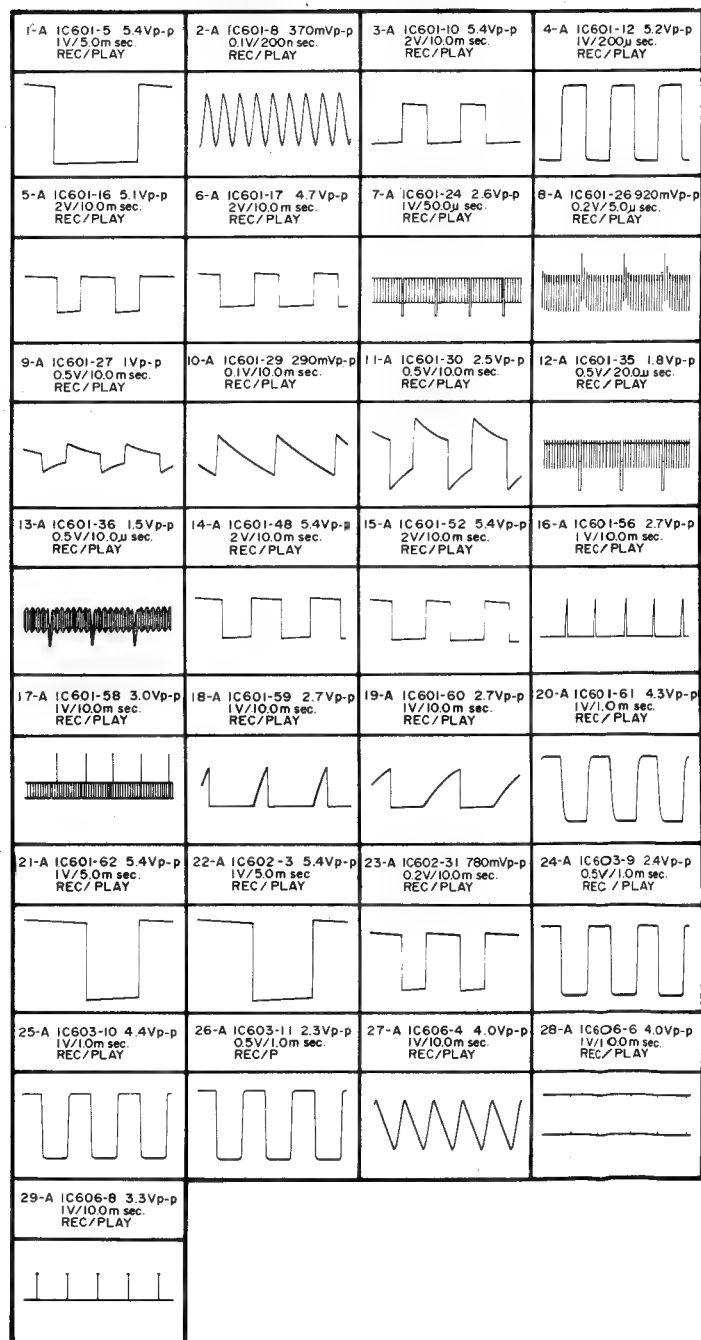
SENSOR P.C.B

DIAGRAM CONFIGURATION	SCHEMATIC	CIRCUIT BOARD
TIMER SUB	5-4	5-6
FRONT SW	5-7	5-7
TIMER/OPERATION SW	5-8	5-10
JACK	5-12	5-24
JACK SUB	5-13	5-22
S-CONNECT(1/2)	5-13	5-34
ON SCREEN DISPLAY	5-14	5-24
OSD SUB	5-15	5-22
FE TUNING	5-16	5-24
PRE/REC AMP	5-17	-
Y	5-18	5-24
S-CONNECT(2/2)	5-18	5-34
CHROMA	5-20	5-24
Y/C SEPARATE	5-20	5-30
INPUT SELECT	5-20	5-30
AUDIO NR	5-32	5-34
FM AUDIO	5-35	5-46
AUDIO I/O	5-36	5-46
SERVO	5-38	5-46
MOTOR DRIVE/TRICK PLAY	5-40	5-46
CAPSTAN MOTOR DRIVE	5-40	-
SENSOR(2/2)	5-41	5-44
SYSTEM CONTROL	5-42	5-46
SENSOR(1/2)	5-43	5-44
REGULATOR	5-48	5-48
REG. IC	5-48	5-49
TUNER UNIT	5-50	-
IF UNIT	5-52	-
RF CONVERTER(For CT)	5-53	-
RF CONVERTER(For VPS)	5-54	-
REMOTE CONTROL	5-55	-

## SERVO WAVEFORMS (SERVO - WELLENFORMEN)

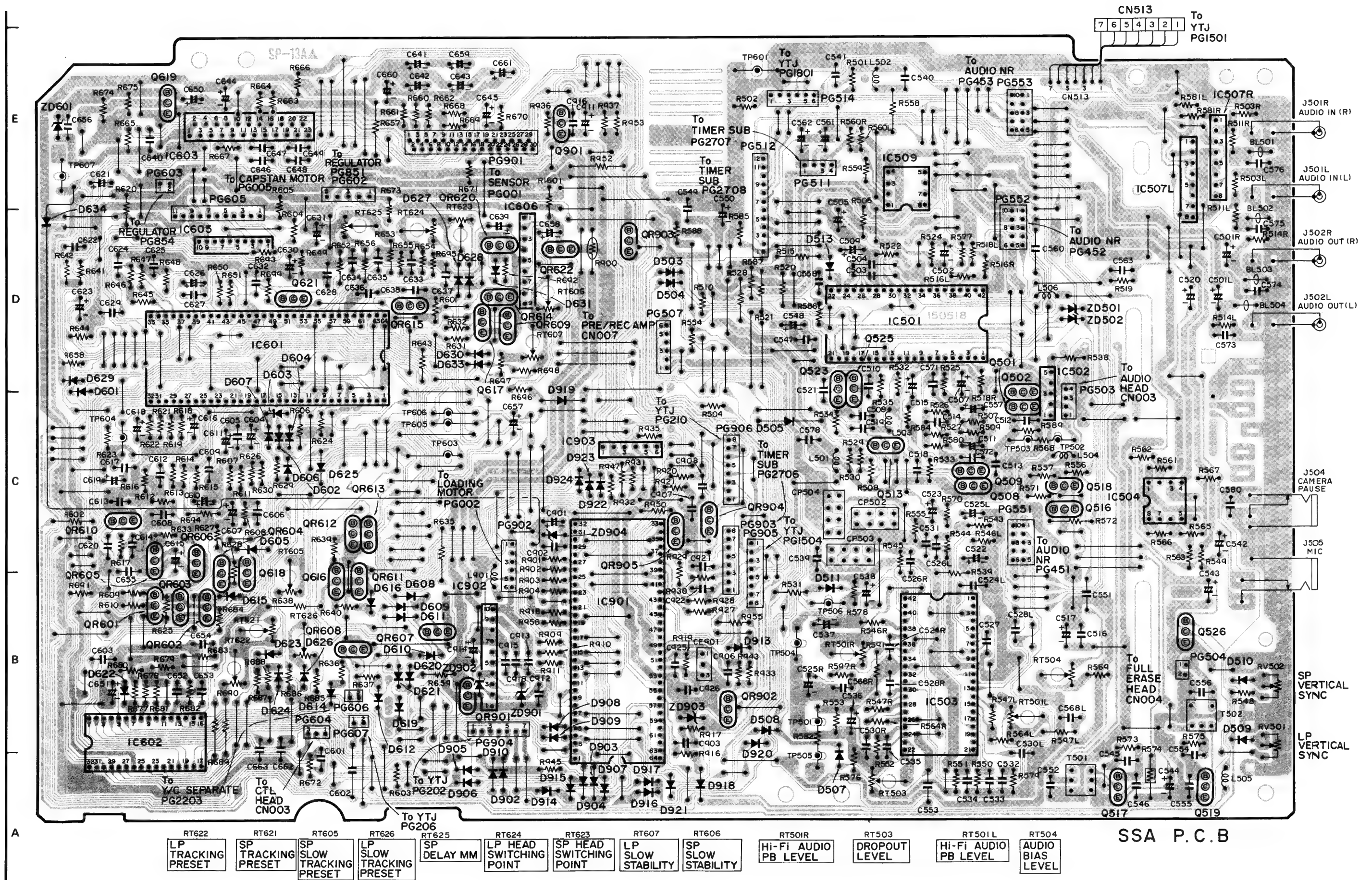
Note: Measurement conditions are as follows.  
REC: Colour bars, 1Vp-p at video input jack.  
PLAY: Use alignment tape (colour bar section).

Hinweis: Die folgenden Meßbedingungen einhalten.  
Aufnahme: Farbbalken, 1Vs-s an Video-Eingangsbuchse.  
Wiedergabe: Abgleichband (Farbbalkenabschnitt) verwenden.





A vertical scale with five horizontal tick marks. The marks are labeled A, B, C, D, and E from bottom to top.





REGULATOR/REG. IC SCHEMATIC DIAGRAM (REGLER/REGLER IC)

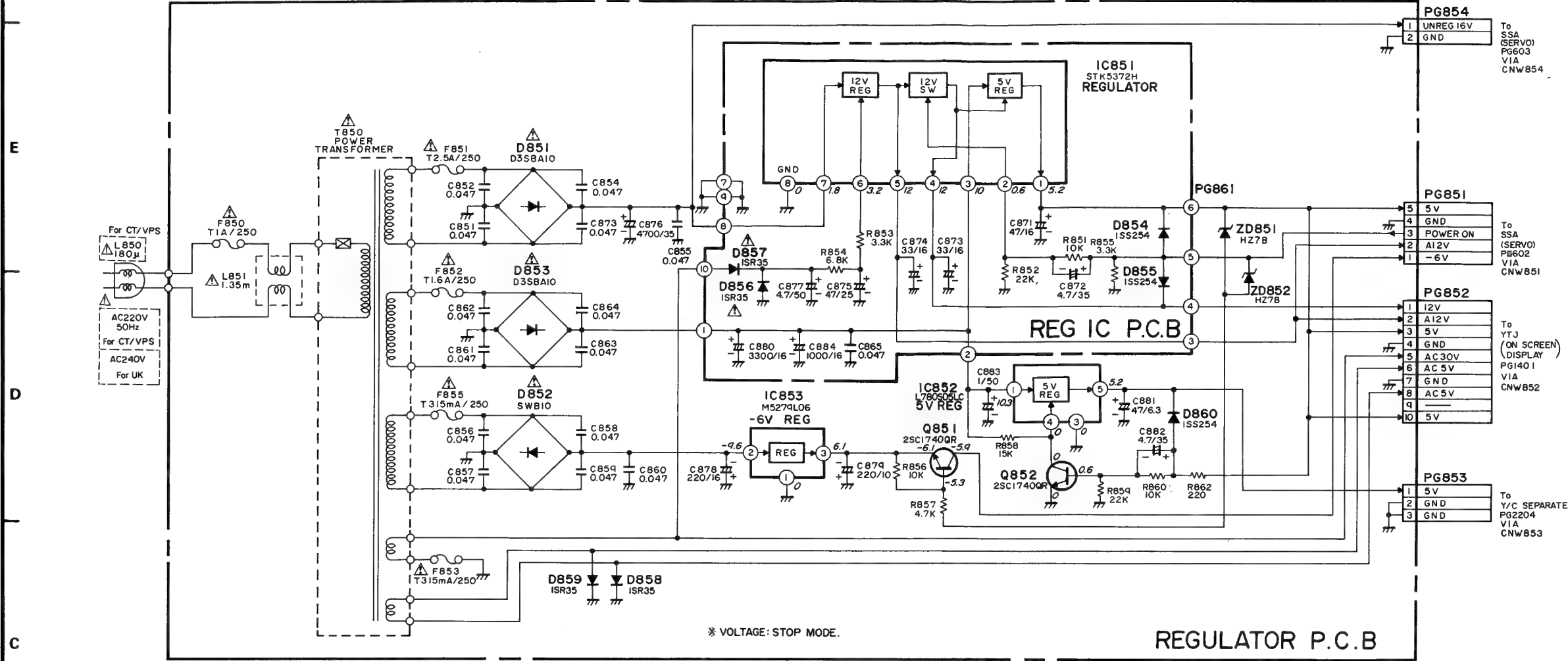


DIAGRAM CONFIGURATION	SCHEMATIC	CIRCUIT BOARD
TIMER SUB	5-4	5-6
FRONT SW	5-7	5-7
TIMER/OPERATION SW	5-8	5-10
JACK	5-12	5-24
JACK SUB	5-13	5-22
S-CONNECT(1/2)	5-13	5-34
ON SCREEN DISPLAY	5-14	5-24
OSD SUB	5-15	5-22
FS TUNING	5-16	5-24
PRE/REC AMP	5-17	-
Y	5-18	5-24
S-CONNECT(2/2)	5-18	5-34
CHROMA	5-20	5-24
Y/C SEPARATE	5-20	5-30
INPUT SELECT	5-29	5-30
AUDIO NR	5-32	5-34
FM AUDIO	5-35	5-48
AUDIO I/O	5-36	5-48
SERVO	5-38	5-48
MOTOR DRIVE/TRICK PLAY	5-40	5-48
CAPSTAN MOTOR DRIVE	5-40	-
SENSOR(2/2)	5-41	5-44
SYSTEM CONTROL	5-42	5-46
SENSOR(1/2)	5-43	5-44
REGULATOR	5-48	5-48
REG. IC	5-48	5-48
TUNER UNIT	5-50	-
IF UNIT	5-52	-
RF CONVERTER(For CT)	5-53	-
RF CONVERTER(For VPS)	5-54	-
REMOTE CONTROL	5-55	-

REG. IC CIRCUIT BOARD DIAGRAM (REGLER IC)

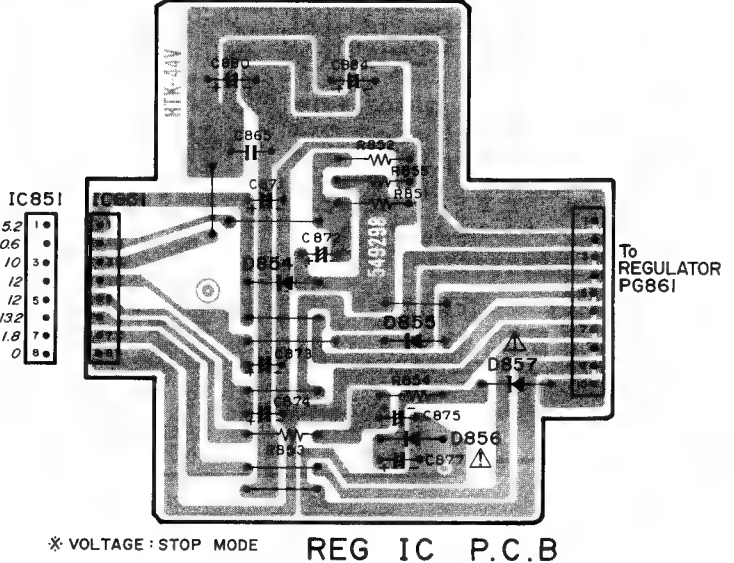
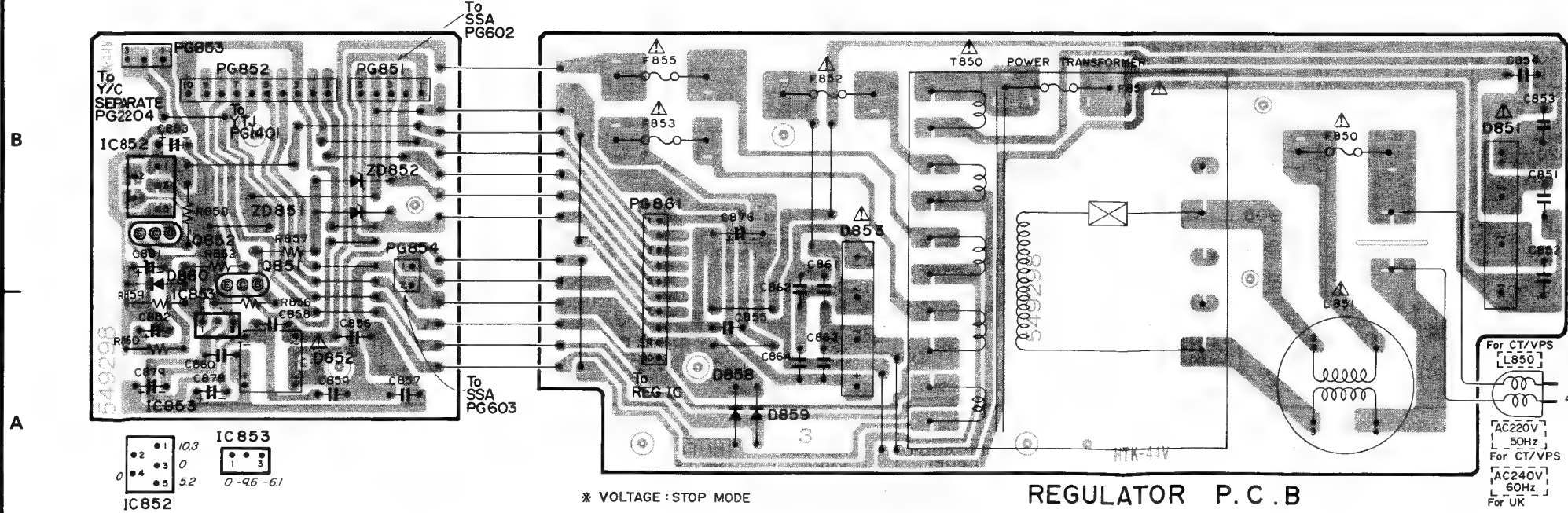
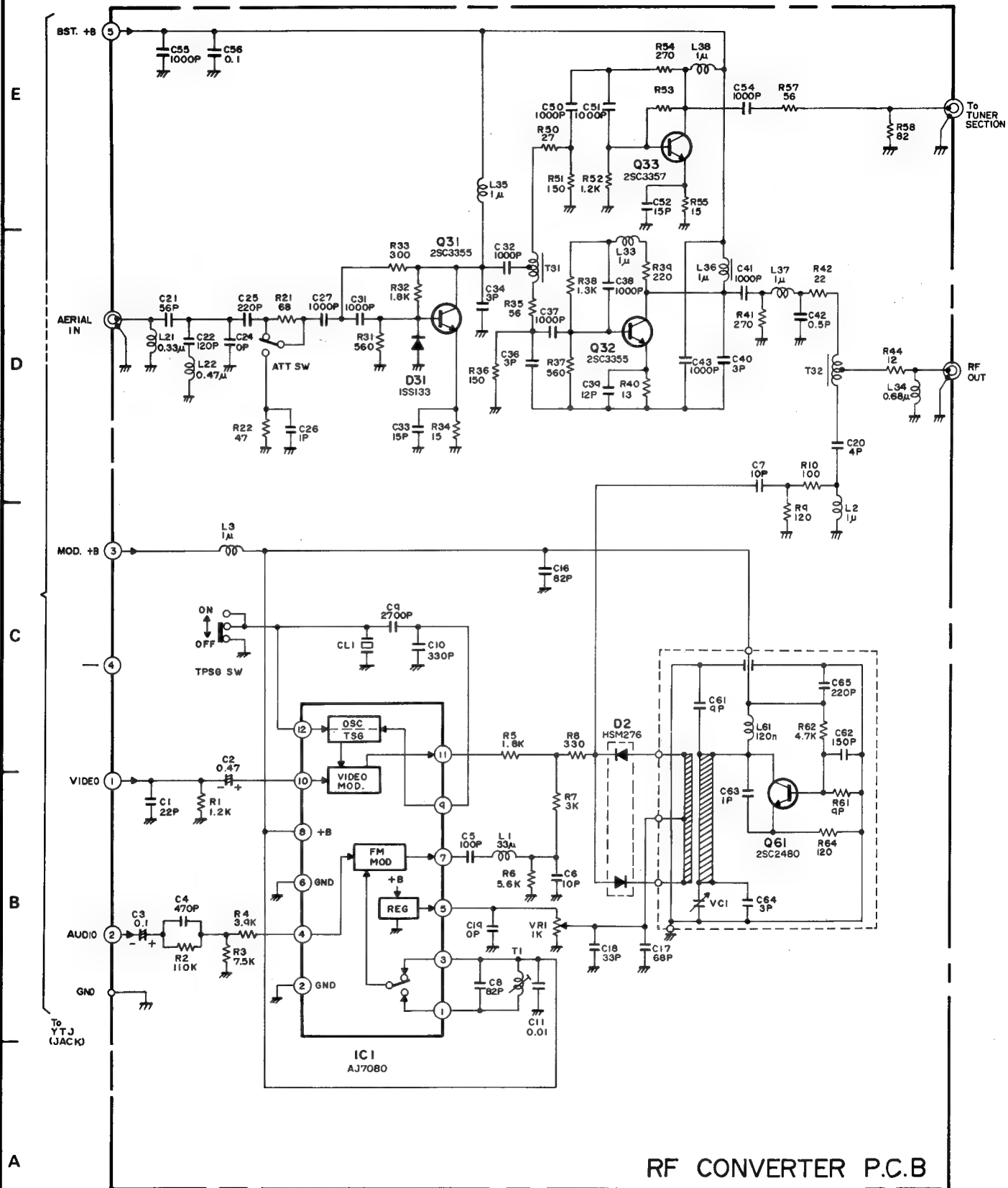


DIAGRAM CONFIGURATION	SCHEMATIC	CIRCUIT BOARD
TIMER SUB	5-4	5-8
FRONT SW	5-7	5-7
TIMER/OPERATION SW	5-8	5-1
JACK	5-12	5-24
JACK SUB	5-13	5-24
S-CONNECT(1/2)	5-13	5-34
VIDEO DISPLAY	5-14	5-4
OSD SUB	5-15	5-22
FS TUNING	5-16	5-24
PRE/REC AMP	5-17	-
Y	5-18	5-24
S-CONNECT(2/2)	5-18	5-34
CHROMA	5-20	5-24
Y SEPARATE	5-20	5-4
INPUT SELECT	5-20	5-30
AUDIO NR	5-32	5-34
FM AUDIO	5-35	5-46
AUDIO I/O	5-36	5-46
SERV	5-38	5-46
MOTOR DRIVE/TRICK PLAY	5-40	5-46
CAPSTAN MOTOR DRIVE	5-40	-
SENSOR(2/2)	5-41	5-44
SYSTEM CONTROL	5-42	5-46
SENSOR(1/2)	5-43	5-44
REGULATOR	5-48	5-46
RF UNIT	5-50	5-49
TUNER UNIT	5-50	-
IF UNIT	5-52	-
RF CONVERTER(For CT)	5-53	-
RF CONVERTER(For VPS)	5-54	-
REMOTE CONTROL	5-55	-

IF/TUNER(TUNER SECTION)P.C.B

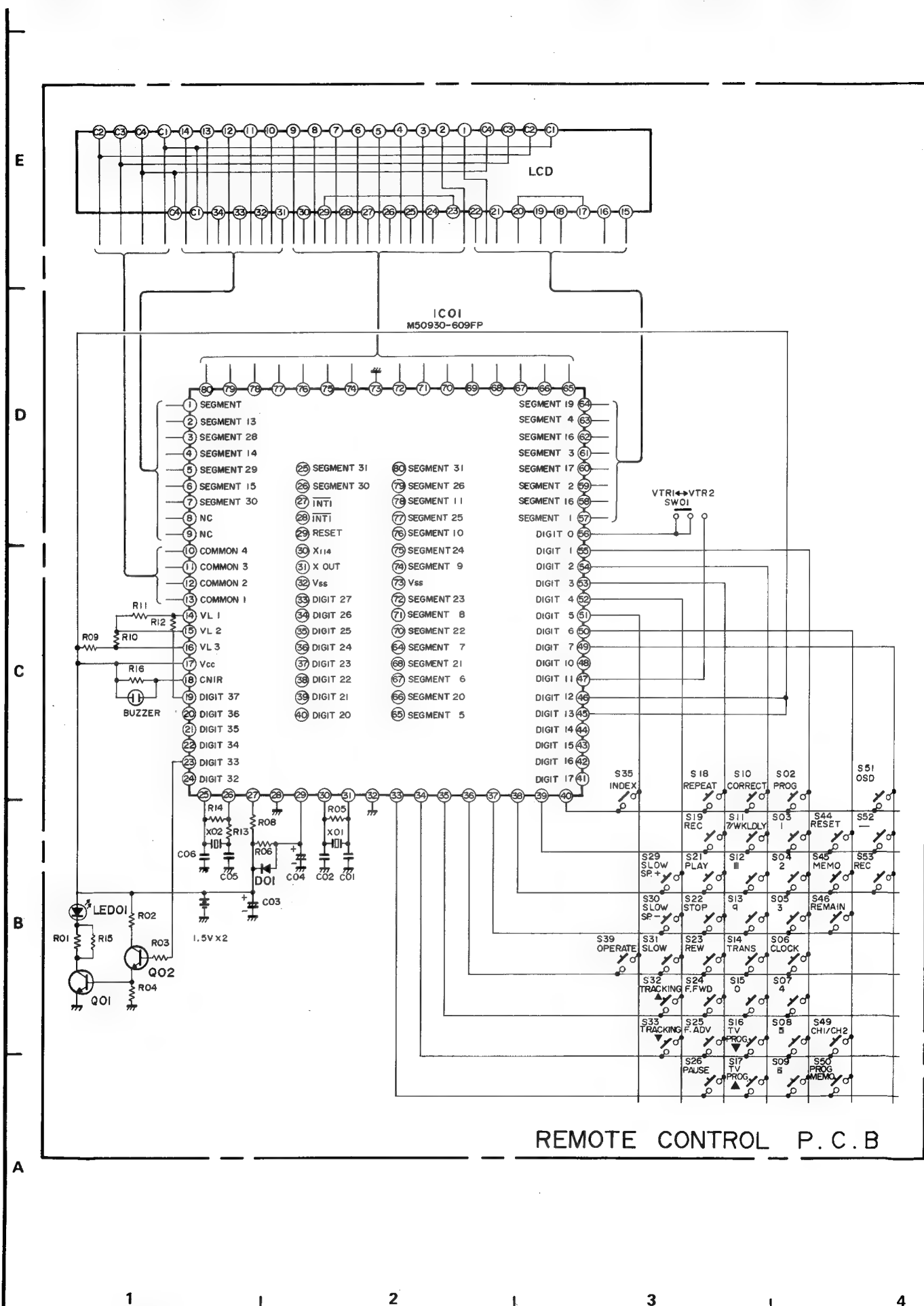
IF/TUNER(IF SECTION)P.C.B

# RF CONVERTER SCHEMATIC DIAGRAM For VPS (HF-KONVERTER Für VPS)



RF CONVERTER P.C.B

# REMOTE CONTROL SCHEMATIC DIAGRAM (FERNBEDIENUNG)



# REPLACEMENT PARTS LIST (ERSATZTEILLISTE)

## ELECTRICAL PARTS LIST (LISTE DER ELEKTRISCHEN TEILE)

SYMBOL—NO	P—NO	DESCRIPTION	SYMBOL—NO	P—NO	DESCRIPTION
CAPACITORS					
C 202	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C 519	0890041	CERAMIC DISC 6800PF+-20% 16V
C 204	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 524L	0208526	CERAMIC DISC 560PF+-5% 50V
			C 524R	0208526	CERAMIC DISC 560PF+-5% 50V
C 205	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 526L	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 206	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C 526R	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 210	0890017	CERAMIC DISC 47PF+-5% 50V	C 527	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 211	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C 528L	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 219	0256836	ELECTROLYTIC 2.2UF 35V	C 528R	0890043	CERAMIC DISC 0.01UF+-20% 16V
			C 531	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 221	0256838	ELECTROLYTIC 10UF 10V	C 532	0890028	CERAMIC DISC 330PF+-10% 50V
C 225	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C 534	0890028	CERAMIC DISC 330PF+-10% 50V
C 226	0890045	CERAMIC DISC 0.047UF+80%-20% 50V	C 535	0208694	CERAMIC DISC 270PF+-5% 50V
C 227	0256676	ELECTROLYTIC 47UF 10V	C 539	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 229	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C 547	0890043	CERAMIC DISC 0.01UF+-20% 16V
			C 549	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 230	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C 551	0890033	CERAMIC DISC 680PF+-10% 50V
C 232	0890024	CERAMIC DISC 150PF+-10% 50V	C 553	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 237	0890019	CERAMIC DISC 680PF+-50% 50V	C 558	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 239	0890012	CERAMIC DISC 18PF+-5% 50V	C 560	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 240	0890011	CERAMIC DISC 15PF+-5% 50V	C 568L	0890015	CERAMIC DISC 33PF+-50% 50V
C 243	0890015	CERAMIC DISC 33PF+-50% 50V	C 568R	0890015	CERAMIC DISC 33PF+-50% 50V
C 244	0890024	CERAMIC DISC 150PF+-10% 50V	C 571	0208526	CERAMIC DISC 560PF+-5% 50V
C 245	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C 572	0890022	CERAMIC DISC 100PF+-10% 50V
C 246	0256298	ELECTROLYTIC 47UF 6.3V	C 573	0890035	CERAMIC DISC 1000PF+-10% 50V
C 247	0890023	CERAMIC DISC 120PF+-10% 50V	C 574	0890035	CERAMIC DISC 1000PF+-10% 50V
C 258	0256676	ELECTROLYTIC 47UF 6.3V	C 575	0890035	CERAMIC DISC 1000PF+-10% 50V
C 260	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 576	0890035	CERAMIC DISC 1000PF+-10% 50V
C 263	0256627	ELECTROLYTIC 47UF 16V	C 578	0890102	CERAMIC DISC 0.022UF+80-20% 50V
C 264	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C 580	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 265	0890023	CERAMIC DISC 120PF+-10% 50V	C 601	0890035	CERAMIC DISC 1000PF+-10% 50V
C 266	0256617	ELECTROLYTIC 22UF 10V	C 602	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 267	0256614	ELECTROLYTIC 10UF 16V	C 603	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 268	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C 605	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 269	0890013	CERAMIC DISC 22PF+-5% 50V	C 610	0256364	ELECTROLYTIC 0.47UF 35V
C 270	0890018	CERAMIC DISC 56PF+-50% 50V	C 611	0256364	ELECTROLYTIC 0.47UF 35V
C 271	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C 617	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 272	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C 622	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 275	0890014	CERAMIC DISC 27PF+-50% 50V	C 627	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 277	0256614	ELECTROLYTIC 10UF 16V	C 633	0890036	CERAMIC DISC 1500PF+-20% 16V
C 301	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 638	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 314	0256781	ELECTROLYTIC 470UF 6.3V	C 646	0890039	CERAMIC DISC 4700PF+-20% 16V
C 318	0256781	ELECTROLYTIC 470UF 6.3V	C 647	0890039	CERAMIC DISC 4700PF+-20% 16V
C 319	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C 648	0890039	CERAMIC DISC 4700PF+-20% 16V
C 321	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 649	0890039	CERAMIC DISC 4700PF+-20% 16V
C 322	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C 656	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 324	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 701	0256489	ELECTROLYTIC 0.047F 5.5V
C 325	0890011	CERAMIC DISC 15PF+-5% 50V	C 702	0256160	ELECTROLYTIC 47UF 6.3V
C 326	0890045	CERAMIC DISC 0.047UF+80%-20% 50V	C 703	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 327	0890045	CERAMIC DISC 0.047UF+80%-20% 50V	C 704	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 330	0890018	CERAMIC DISC 56PF+-50% 50V	C 705	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 331	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 709	0256153	ELECTROLYTIC 3.3MF 50V
C 351	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 710	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 354	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 711	0256160	ELECTROLYTIC 47UF 6.3V
C 355	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 713	0256150	ELECTROLYTIC 0.47UF 50V
C 357	0890007	CERAMIC DISC 8.2PF+-10% 50V	C 714	0256164	ELECTROLYTIC 0.1UF 50V
C 409L	0890008	CERAMIC DISC 10PF+-5% 50V	C 715	0256160	ELECTROLYTIC 47UF 6.3V
C 409R	0890008	CERAMIC DISC 10PF+-5% 50V	C 716	5058562	TRIMMER 20PF
C 419	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 718	0256731	ELECTROLYTIC 220UF 6.3V
C 420	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 772	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 422	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 773	0256155	ELECTROLYTIC 10UF 16V
C 503	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 774	0239375	CERAMIC DISC 22000PF+80-20% 25V
C 504	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 832	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 512	0890031	CERAMIC DISC 470PF+-10% 50V	C 834	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 513	0890038	CERAMIC DISC 3300PF+-20% 16V	C 836	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 516	0890043	CERAMIC DISC 0.01UF+-20% 16V	C 838	0890043	CERAMIC DISC 0.01UF+-20% 16V



SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
C 840	0890043	CERAMIC DISC 0.01UF+-20% 16V	C2226	0201006	CERAMIC CHIP 0.01UF+80-20% 50V
C 842	0890043	CERAMIC DISC 0.01UF+-20% 16V	C2231	0201027	CERAMIC CHIP 47PF+-5% 50V
C 844	0890043	CERAMIC DISC 0.01UF+-20% 16V	C2233	0201009	CERAMIC CHIP 0.022UF+80-20% 25V
C 876	0256888	ELECTROLYTIC 4700UF 35V	C2235	0201001	CERAMIC CHIP 22PF+-5% 50V
C 878	0256603	ELECTROLYTIC 220UF 16V	C2238	0201009	CERAMIC CHIP 0.022UF+80-20% 25V
C 880	0256873	ELECTROLYTIC 3300UF 16V	C2239	0256842	ELECTROLYTIC 22UF 16V
C 884	0256859	ELECTROLYTIC 1000UF 16V	C2244	0201009	CERAMIC CHIP 0.022UF+80-20% 25V
C 902	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C2260	0201020	CERAMIC CHIP 10PF+-0.5% 50V
C 903	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C2303	0201009	CERAMIC CHIP 0.022UF+80-20% 25V
C 906	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C2306	0201024	CERAMIC CHIP 27PF+-5% 50V
C 907	0890043	CERAMIC DISC 0.01UF+-20% 16V	C2309	0201006	CERAMIC CHIP 0.01UF+80-20% 50V
C 908	0890043	CERAMIC DISC 0.01UF+-20% 16V	C2311	0201068	CERAMIC CHIP 0.033UF+80-20% 25V
C 912	0890043	CERAMIC DISC 0.01UF+-20% 16V	C2312	0201037	CERAMIC CHIP 330PF+-5% 50V
C 913	0890043	CERAMIC DISC 0.01UF+-20% 16V	C2316	0201009	CERAMIC CHIP 0.022UF+80-20% 25V
C 915	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C2323	0201009	CERAMIC CHIP 0.022UF+80-20% 25V
C 916	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C2324	0201009	CERAMIC CHIP 0.022UF+80-20% 25V
C 918	0890043	CERAMIC DISC 0.01UF+-20% 16V	C2326	0201009	CERAMIC CHIP 0.022UF+80-20% 25V
C 921	0890022	CERAMIC DISC 100PF+-10% 50V	C2327	0201026	CERAMIC CHIP 39PF+-5% 50V
C 922	0890022	CERAMIC DISC 100PF+-10% 50V	C2328	0201022	CERAMIC CHIP 15PF+-5% 50V
C 925	0890015	CERAMIC DISC 33PF+-50% 50V	C2331	0201035	CERAMIC CHIP 220PF+-5% 50V
C 926	0890015	CERAMIC DISC 33PF+-50% 50V	C2340	0201030	CERAMIC CHIP 82PF+-5% 50V
C1251	0890032	CERAMIC 560PF+-10% 50V	C2701	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C1252	0890027	CERAMIC DISC 270PF+-10% 50V	C2705	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C1409	0890015	CERAMIC DISC 33PF+-50% 50V	C2706	0256160	ELECTROLYTIC 47UF 6.3V
C1424	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C2708	0890011	CERAMIC DISC 15PF+-5% 50V
C1437	0890044	CERAMIC DISC 0.022UF+80-20% 25V	C2709	0890011	CERAMIC DISC 15PF+-5% 50V
C1439	0208042	CERAMIC DISC 33PF+-5% 50V	RESISTORS		
C1491	0209171	CERAMIC DISC 0.01UF+80-20% 50V	R 574	0170471	FUSE RESISTOR 2.20HM+-5% 1/4W
C1492	0209171	CERAMIC DISC 0.01UF+80-20% 50V	R2202	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
C1493	0209171	CERAMIC DISC 0.01UF+80-20% 50V	R2204	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
C1495	0890043	CERAMIC DISC 0.01UF+-20% 16V	R2205	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
C1496	0890043	CERAMIC DISC 0.01UF+-20% 16V	R2206	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
C1501	0890035	CERAMIC DISC 1000PF+-10% 50V	R2207	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C1502	0890035	CERAMIC DISC 1000PF+-10% 50V	R2208	0103834	CHIP RESISTOR 1800HM+-5% 0.1W
C1503	0890035	CERAMIC DISC 1000PF+-10% 50V	R2209	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C1504	0890035	CERAMIC DISC 1000PF+-10% 50V	R2210	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C1505	0256626	ELECTROLYTIC 47UF 6.3V	R2211	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C1508	0890044	CERAMIC DISC 0.022UF+80-20% 25V	R2212	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
C1512	0890043	CERAMIC DISC 0.01UF+-20% 16V	R2213	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
C1513	0890044	CERAMIC DISC 0.022UF+80-20% 25V	R2214	0103880	CHIP RESISTOR 1.5MOHM+-10% 0.1W
C1515	0890017	CERAMIC DISC 47PF+-5% 50V	R2215	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
C1517	0890044	CERAMIC DISC 0.022UF+80-20% 25V	R2216	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C1520	0890044	CERAMIC DISC 0.022UF+80-20% 25V	R2217	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C1522	0890044	CERAMIC DISC 0.022UF+80-20% 25V	R2218	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
C1523	0256627	ELECTROLYTIC 47UF 16V	R2219	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
C1528	0209173	CERAMIC DISC 0.022UF+-10% 50V	R2220	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
C1551	0890044	CERAMIC DISC 0.022UF+80-20% 25V	R2221	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
C1554	0890043	CERAMIC DISC 0.01UF+-20% 16V	R2222	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C2201	0201037	CERAMIC CHIP 330PF+-5% 50V	R2223	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
C2202	0201006	CERAMIC CHIP 0.01UF+80-20% 50V	R2224	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
C2203	0201095	CERAMIC CHIP 68PF+-5% 50V	R2225	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C2206	0201024	CERAMIC CHIP 27PF+-5% 50V	R2226	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
C2209	0201009	CERAMIC CHIP 0.022UF+80-20% 25V	R2227	0103842	CHIP RESISTOR 8200HM+-5% 0.1W
C2210	0201006	CERAMIC CHIP 0.01UF+80-20% 50V	R2228	0103842	CHIP RESISTOR 8200HM+-5% 0.1W
C2211	0201006	CERAMIC CHIP 0.01UF+80-20% 50V	R2229	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
C2212	0201006	CERAMIC CHIP 0.01UF+80-20% 50V	R2230	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C2213	0201006	CERAMIC CHIP 0.01UF+80-20% 50V	R2231	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C2214	0201006	CERAMIC CHIP 0.01UF+80-20% 50V	R2232	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
C2215	0201006	CERAMIC CHIP 0.01UF+80-20% 50V	R2233	0103834	CHIP RESISTOR 1800HM+-5% 0.1W
C2216	0201006	CERAMIC CHIP 0.01UF+80-20% 50V	R2234	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
C2218	0256161	ELECTROLYTIC 22UF 6.3V	R2235	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
C2221	0201006	CERAMIC CHIP 0.01UF+80-20% 50V	R2236	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
C2222	0201006	CERAMIC CHIP 0.01UF+80-20% 50V	R2237	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
C2223	0201032	CERAMIC CHIP 120PF+-5% 50V			
C2225	0201006	CERAMIC CHIP 0.01UF+80-20% 50V			

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
R2238	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R2331	0103832	CHIP RESISTOR 120OHM+-5% 0.1W
R2239	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R2332	0103832	CHIP RESISTOR 120OHM+-5% 0.1W
R2240	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	RT 201	5030004	SEMI VARIABLE 1KOHM
R2241	0103837	CHIP RESISTOR 330OHM+-5% 0.1W	RT 301	5030005	SEMI VARIABLE 2.2KOHM
R2242	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	RT 351	5030003	SEMI VARIABLE 470OHM
R2243	0103839	CHIP RESISTOR 470OHM+-5% 0.1W	RT 501L	5035031	SEMI VARIABLE 100KOHM
R2244	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W	RT 501R	5035031	SEMI VARIABLE 100KOHM
R2245	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W	RT 503	5035029	SEMI VARIABLE 47KOHM
R2246	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W	RT 504	5035031	SEMI VARIABLE 100KOHM
R2247	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W	RT 605	5030013	SEMI VARIABLE 470KOHM
R2248	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	RT 606	5030009	SEMI VARIABLE 47KOHM
R2249	0103837	CHIP RESISTOR 330OHM+-5% 0.1W	RT 607	5030011	SEMI VARIABLE 100KOHM
R2250	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	RT 621	5030012	SEMI VARIABLE 220KOHM
R2251	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W	RT 622	5030012	SEMI VARIABLE 220KOHM
R2252	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W	RT 623	5030013	SEMI VARIABLE 470KOHM
R2253	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	RT 624	5030013	SEMI VARIABLE 470KOHM
R2254	0103839	CHIP RESISTOR 470OHM+-5% 0.1W	RT 625	5030011	SEMI VARIABLE 100KOHM
R2259	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	RT 626	5030013	SEMI VARIABLE 470KOHM
R2260	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	RT2201	5035023	VARIABLE 470OHM
R2261	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	RT2205	5035024	SEMI VARIABLE 1KOHM
R2262	0103831	CHIP RESISTOR 100OHM+-5% 0.1W	RT2304	5035029	SEMI VARIABLE 47KOHM
R2263	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	RT2305	5035026	SEMI VARIABLE 4.7KOHM
R2264	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W	RT2306	5035026	SEMI VARIABLE 4.7KOHM
R2265	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	RV 501	5009147	VARIABLE 50KOHM
R2266	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W	RV 502	5009147	VARIABLE 50KOHM
R2267	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	RV 701	5009116	VARIABLE 10KOHM
R2268	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	RV 703	5009114	RESISTOR VARIABLE 500KOHM
R2269	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W	RV 704	5005575	RESISTOR VARIABLE 10KOHMX2
R2270	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W	RV 705	5020222	SEMI VARIABLE 100KOHM
R2271	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W			
R2272	0103842	CHIP RESISTOR 820OHM+-5% 0.1W			SEMI-CONDUCTORS
R2273	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	D 141	5380933	LED GL-451
R2274	0103842	CHIP RESISTOR 820OHM+-5% 0.1W	D 202	5339231	DIODE 1SR35-100A
R2275	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	D 203	5339131	DIODE 1SS254
R2276	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W			
R2277	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	D 204	5339131	DIODE 1SS254
R2278	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W	D 205	5339131	DIODE 1SS254
R2279	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W	D 206	5339131	DIODE 1SS254
R2280	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	D 208	5339131	DIODE 1SS254
R2301	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W	D 209	5339131	DIODE 1SS254
R2302	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W	D 210	5339131	DIODE 1SS254
R2303	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W	D 211	5339131	DIODE 1SS254
R2304	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	D 301	5339131	DIODE 1SS254
R2305	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W	D 302	5339131	DIODE 1SS254
R2306	0103835	CHIP RESISTOR 220OHM+-5% 0.1W	D 401	5339131	DIODE 1SS254
R2307	0103866	CHIP RESISTOR 82KOHM+-5% 0.1W	D 503	5339131	DIODE 1SS254
R2308	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W	D 504	5339131	DIODE 1SS254
R2309	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	D 505	5339131	DIODE 1SS254
R2310	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	D 507	5339131	DIODE 1SS254
R2311	0103831	CHIP RESISTOR 100OHM+-5% 0.1W	D 508	5339131	DIODE 1SS254
R2312	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	D 509	5339131	DIODE 1SS254
R2313	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	D 510	5339131	DIODE 1SS254
R2314	0103837	CHIP RESISTOR 330OHM+-5% 0.1W	D 511	5339131	DIODE 1SS254
R2315	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W	D 513	5339131	DIODE 1SS254
R2316	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	D 601	5339131	DIODE 1SS254
R2319	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	D 602	5339131	DIODE 1SS254
R2320	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	D 603	5339131	DIODE 1SS254
R2321	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	D 604	5339131	DIODE 1SS254
R2322	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	D 605	5339131	DIODE 1SS254
R2323	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	D 606	5339131	DIODE 1SS254
R2324	0103875	CHIP RESISTOR 470KOHM+-5% 0.1W	D 607	5339131	DIODE 1SS254
R2325	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	D 608	5339131	DIODE 1SS254
R2326	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	D 609	5339131	DIODE 1SS254
R2328	0103838	CHIP RESISTOR 390OHM+-5% 0.1W	D 610	5339131	DIODE 1SS254
R2330	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	D 611	5339131	DIODE 1SS254

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
D 612	5339131	DIODE 1SS254	D 905	5339131	DIODE 1SS254
D 614	5339131	DIODE 1SS254	D 906	5339131	DIODE 1SS254
D 615	5339131	DIODE 1SS254	D 907	5339131	DIODE 1SS254
D 616	5339131	DIODE 1SS254	D 908	5339131	DIODE 1SS254
D 619	5339131	DIODE 1SS254	D 909	5339131	DIODE 1SS254
D 620	5339131	DIODE 1SS254	D 910	5339131	DIODE 1SS254
D 621	5339131	DIODE 1SS254	D 913	5339131	DIODE 1SS254
D 622	5339131	DIODE 1SS254	D 914	5339131	DIODE 1SS254
D 623	5339131	DIODE 1SS254	D 915	5339131	DIODE 1SS254
D 624	5339131	DIODE 1SS254	D 916	5339131	DIODE 1SS254
D 625	5339131	DIODE 1SS254	D 917	5339131	DIODE 1SS254
D 626	5339131	DIODE 1SS254	D 918	5339131	DIODE 1SS254
D 627	5339131	DIODE 1SS254	D 919	5339131	DIODE 1SS254
D 628	5339131	DIODE 1SS254	D 920	5339131	DIODE 1SS254
D 629	5339131	DIODE 1SS254	D 921	5339131	DIODE 1SS254
D 630	5339131	DIODE 1SS254	D 922	5339131	DIODE 1SS254
D 631	5339131	DIODE 1SS254	D 923	5339131	DIODE 1SS254
D 633	5339131	DIODE 1SS254	D 924	5339131	DIODE 1SS254
D 701	5339131	DIODE 1SS254	D1401	5339131	DIODE 1SS254
D 702	5339131	DIODE 1SS254	D1402	5339131	DIODE 1SS254
D 703	5339131	DIODE 1SS254	D1490	5339171	DIODE 1SS130M
D 704	5339131	DIODE 1SS254	D1491	5339171	DIODE 1SS130M
D 705	5339131	DIODE 1SS254	D1492	5339171	DIODE 1SS130M
D 706	5339131	DIODE 1SS254	D1493	5339171	DIODE 1SS130M
D 707	5339131	DIODE 1SS254	D1494	5332541	DIODE ERA81-004P
D 708	5339131	DIODE 1SS254	D1495	5332541	DIODE ERA81-004P
D 709	5339131	DIODE 1SS254	D1501	5339131	DIODE 1SS254
D 711	5339131	DIODE 1SS254	D1502	5339131	DIODE 1SS254
D 713	5339131	DIODE 1SS254	D1503	5339131	DIODE 1SS254
D 714	5332782	DIODE 1SS254	D1505	5339131	DIODE 1SS254
D 715	5332782	DIODE 1SS254	D1506	5339131	DIODE 1SS254
D 716	5339131	DIODE 1SS254	D1581	5339131	DIODE 1SS254
D 718	5339131	DIODE 1SS254	D1801	5339131	DIODE 1SS254
D 719	5339131	DIODE 1SS254	D2201	5328301	DIODE MA151WK (MT)
D 721	5339131	DIODE 1SS254	D2202	5328301	DIODE MA151WK (MT)
D 722	5339131	DIODE 1SS254	D2203	5328321	DIODE MA151K (MH)
D 726	5339131	DIODE 1SS254	D2204	5328301	DIODE MA151WK (MT)
D 734	5339131	DIODE 1SS254	D2205	5328321	DIODE MA151K (MH)
D 735	5339131	DIODE 1SS254	D2206	5328301	DIODE MA151WK (MT)
D 736	5339131	DIODE 1SS254	D2207	5332781	DIODE 1SS254
D 739	5339131	DIODE 1SS254	D2208	5332781	DIODE 1SS254
D 740	5339131	DIODE 1SS254	D2301	5328302	DIODE MA151WA(MN)
D 751	5381662	DIODE 34MT3-F	D2302	5328302	DIODE MA151WA(MN)
D 752	5381214	LED SEL2213E	D2303	5328321	DIODE MA151K (MH)
D 753	5381214	LED SEL2213E	D2304	5328321	DIODE MA151K (MH)
D 754	5381211	LED SEL2213C	D2305	5328321	DIODE MA151K (MH)
D 755	5381214	LED SEL2213E	D2306	5328321	DIODE MA151K (MH)
D 757	5380691	LED SLR34UR5	D2701	5339131	DIODE 1SS254
D 758	5381211	LED SEL-2213C	D2705	5339131	DIODE 1SS254
D 801	5339131	DIODE 1SS254	D2706	5339131	DIODE 1SS254
D 802	5339231	DIODE 1SR35-100A	D2707	5339131	DIODE 1SS254
D 803	5339231	DIODE 1SR35-100A	IC 141	5391282	IC DN6851HI
△ D 851	5333351	DIODE D3SBA10	IC 142	5391282	IC DN6851HI
△ D 852	5331921	DIODE S1WB10	IC 201	5388836	IC HT4927E
△ D 853	5333351	DIODE D3SBA10	IC 202	5388734	IC HN7131C
D 854	5339131	DIODE 1SS254	IC 203	1370881	IC HN7124
D 855	5339131	DIODE 1SS254	IC 204	1378023	PWB ASSY VIDEO EQUALIZER(HN7129B)
△ D 856	5339231	DIODE 1SR35-100A	IC 205	1387703	PWB ASSY V-SUG COMPE.(HES8044B)
△ D 857	5339231	DIODE 1SR35-100A	IC 206	1380113	PWB ASSY REC OSD(HES8068B)
D 858	5339231	DIODE 1SR35-100A	IC 207	5721803	IC PROTECTOR(1CP-N10)
D 859	5339231	DIODE 1SR35-100A	IC 212	5721802	IC PROTECTOR(2CP-N5)
D 860	5339131	DIODE 1SS254	IC 301	5388844	IC HT4909C
D 902	5339131	DIODE 1SS254	IC 351	1380212	PWB ASSY SECAM DET(HES8074A)
D 903	5339131	DIODE 1SS254	IC 352	1341921	IC BA7267S
D 904	5339131	DIODE 1SS254	IC 401	5300671	IC BA7720S

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
IC 402	5300702	IC M51131L	Q 207	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC 403	5369181	IC M5218L	Q 210	5327073	TRANSISTOR DTC144ES
IC 405	5369181	IC M5218L	Q 211	5327073	TRANSISTOR DTC144ES
IC 451	5369181	IC M5218L	Q 212	5327073	TRANSISTOR DTC144ES
IC 452	5369181	IC M5218L	Q 213	5324641	TRANSISTOR 2SA1374C
IC 501	1341881	IC HA12139N	Q 214	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC 502	5300641	IC BA7755	Q 215	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC 503	5300871	IC HA12118N	Q 216	5327073	TRANSISTOR DTC144ES
IC 504	5367771	IC BA4558D	Q 217	5327074	TRANSISTOR DTA144ES
IC 507L	5366981	IC M5201L	Q 218	5327073	TRANSISTOR DTC144ES
IC 507R	5366981	IC M5201L	Q 219	5327074	TRANSISTOR DTA144ES
IC 509	5367771	IC BA4558D	Q 220	5327073	TRANSISTOR DTC144ES
IC 601	1341851	IC HD49726NT	Q 221	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC 602	5300821	IC M54874P	Q 222	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC 603	5355582	IC HA13403V	Q 223	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC 605	1387231	MODULE BX7506	Q 224	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC 606	1341693	IC NJM2233BSA	Q 225	5327073	TRANSISTOR DTC144ES
IC 701	5302351	IC M50955-679SP	Q 226	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC 702	5301281	IC M58630P	Q 227	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC 703	5361942	IC S-8053ALB	Q 229	5327073	TRANSISTOR DTC144ES
IC 771	5369181	IC M5218L	Q 301	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC 801	1380263	PWB ASSY FS(HES8457B)	Q 302	5327073	TRANSISTOR DTC144ES
IC 802	5364303	IC NJM78M05E	Q 303	5327073	TRANSISTOR DTC144ES
IC 803	5721941	IC PROTECTOR	Q 304	5327073	TRANSISTOR DTC144ES
IC 804	5721941	IC PROTECTOR	Q 305	5327073	TRANSISTOR DTC144ES
IC 851	5300452	IC STK5372H	Q 306	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC 852	5367853	IC L780S05LC	Q 307	5327062	TRANSISTOR DTC144ES
IC 853	1341651	IC M5279L06	Q 351	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC 901	5302823	IC HD4074008A03S	Q 352	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC 902	5300794	IC BA6209U4	Q 353	5327073	TRANSISTOR DTC144ES
IC 903	1387951	PWB ASSY TAPE END DET(BX7552)	Q 354	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC1401	1380471	PWB ASSY OSD(PLT-623-0008)	Q 401L	5327063	TRANSISTOR 2SC1740(S,RS)
IC1404	1380561	PWB ASSY OSD MIX(HES8077)	Q 401R	5327063	TRANSISTOR 2SC1740(S,RS)
IC1405	1387703	PWB ASSY V-SAG COMPE.(HES8044B)	Q 402	5327063	TRANSISTOR 2SC1740(S,RS)
IC1406	1387912	PWB ASSY HES8052A FOR VT-S85E(VPS)	Q 403L	5327111	TRANSISTOR 2SC2784E
IC1490	5721802	IC PROTECTOR	Q 403R	5327111	TRANSISTOR 2SC2784E
IC1492	5364602	IC M5278L56	Q 404	5327084	TRANSISTOR RT1P441S
IC1493	5721941	IC PROTECTOR	Q 405L	5327111	TRANSISTOR 2SC2784E
IC1501	1342531	IC BA7604N	Q 405R	5327111	TRANSISTOR 2SC2784E
IC1502	1342031	IC NJM2248S	Q 501	5327073	TRANSISTOR DTC144ES
IC1550	5369431	IC LA7016	Q 502	5327031	TRANSISTOR 2SA673C
IC1801	1380481	PWB ASSY DEMODULATOR(MIC3803)	Q 508	5327073	TRANSISTOR DTC144ES
IC2201	1342291	IC HA118083	Q 509	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)
IC2202	1380681	PWB ASSY Y/C SEPARATE CCD(MS736)	Q 513	5327073	TRANSISTOR DTC144ES
IC2203	1342191	IC AN6308	Q 516	5327021	TRANSISTOR 2SA844CD
IC2204	1341691	IC NJM2234S	Q 517	5327141	TRANSISTOR 2SD468C
IC2205	1342191	IC AN6308	Q 518	5327021	TRANSISTOR 2SA844CD
IC2301	1340041	IC HA118070	Q 519	5327111	TRANSISTOR 2SC2784E
IC2302	5366171	IC BA7023L	Q 523	5327073	TRANSISTOR DTC144ES
IC2303	1342771	IC HA118099NT	Q 525	5327073	TRANSISTOR DTC144ES
IC2304	1340041	IC HA118070	Q 526	5327073	TRANSISTOR DTC144ES
IC2305	5359981	IC MPD4030BC	Q 616	5327063	TRANSISTOR 2SC1740(S,RS)
IC2306	5365601	IC UPD4013BC	Q 617	5327063	TRANSISTOR 2SC1740(S,RS)
IC2307	5361482	IC UPD4538BC	Q 618	5327063	TRANSISTOR 2SC1740(S,RS)
IC2308	5362211	IC HD14053BP	Q 619	5323421	TRANSISTOR 2SD1276
IC2309	1380601	PWB ASSY SKEW COMPE CCD(PLT6230)	Q 621	5327063	TRANSISTOR 2SC1740(S,RS)
IC2310	5721802	IC PROTECTOR(ICP-N5)	Q 701	5327063	TRANSISTOR 2SC1740(S,RS)
IC2701	5306464	IC HD4074008F	Q 704	5327063	TRANSISTOR 2SC1740(S,RS)
Q 141	5324661	TRANSISTOR PT481F	Q 801	5324631	TRANSISTOR 2SA1390C
Q 142	5324661	TRANSISTOR PT483F	Q 802	5322833	TRANSISTOR 2SA933S-R
Q 201	5324631	TRANSISTOR 2SA1390C	Q 851	5327231	TRANSISTOR 2SC1741QR
Q 202	5327073	TRANSISTOR DTC144ES	Q 852	5327231	TRANSISTOR 2SC1741QR
Q 203	5324631	TRANSISTOR 2SA1390	Q 901	5327091	TRANSISTOR 2SD1504E
Q 204	5321214	TRANSISTOR 2SD468	Q1401	5324631	TRANSISTOR 2SA1390C
Q 205	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)	Q1402	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
Q1403	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)	QR 902	5327073	TRANSISTOR DTC144ES
Q1409	5327073	TRANSISTOR DTC144ES	QR 903	5327073	TRANSISTOR DTC144ES
Q1490	5327031	TRANSISTOR 2SA673C	QR 904	5327073	TRANSISTOR DTC144ES
Q1503	5327031	TRANSISTOR 2SA673C	QR 905	5327073	TRANSISTOR DTC144ES
Q1504	1320012	TRANSISTOR 2SA933 (S,R)	QR1404	5327073	TRANSISTOR DTC144ES
Q1505	5327031	TRANSISTOR 2SA673C	QR1405	5327073	TRANSISTOR DTC144ES
Q1506	1320012	TRANSISTOR 2SA933(SR)	QR1406	5327073	TRANSISTOR DTC144ES
Q1550	5324631	TRANSISTOR 2SA1390C	QR1501	5327074	TRANSISTOR DTA144ES
Q1551	5327031	TRANSISTOR 2SA673C	QR1502	5327073	TRANSISTOR DTC144ES
Q1581	5327062	TRANSISTOR 2SC1740SR(2SC1740S OR R)	QR1503	5327073	TRANSISTOR DTC144ES
Q2201	5328971	TRANSISTOR 2SC2412KR(BR)	QR1504	5327074	TRANSISTOR DTA144ES
Q2202	5328961	TRANSISTOR 2SA1037KS(FS)	QR1581	5327071	TRANSISTOR DTC124ES
Q2203	5328961	TRANSISTOR 2SA1037KS(FS)	QR1801	5327073	TRANSISTOR DTC144ES
Q2204	5328793	TRANSISTOR DTC144K-26	QR1802	5327073	TRANSISTOR DTC144ES
Q2205	5328971	TRANSISTOR 2SC2412KR(BR)	QR1803	5327073	TRANSISTOR DTC144ES
Q2206	5328961	TRANSISTOR 2SA1037KS(FS)	QR1804	5327073	TRANSISTOR DTC144ES
Q2207	5328791	TRANSISTOR DTC124K(25)	QR1805	5327073	TRANSISTOR DTC144ES
Q2208	5328971	TRANSISTOR 2SC2412KR(BR)	QR2701	5323563	TRANSISTOR DTC144F
Q2209	5328971	TRANSISTOR 2SC2412KR(BR)	ZD 201	5339273	DIODE HZS11A3
Q2210	5328793	TRANSISTOR DTC144K-26	ZD 401	5339272	DIODE HZS6-A3
Q2211	5328793	TRANSISTOR DTC144K-26	ZD 402	5339272	DIODE HZS6-A3
Q2212	5328971	TRANSISTOR 2SC2412KR(BR)	ZD 501	5339271	DIODE HZS9A2
Q2213	5328971	TRANSISTOR 2SC2412KR(BR)	ZD 502	5339271	DIODE HZS9A2
Q2214	5328793	TRANSISTOR DTC144K-26	ZD 601	5339274	DIODE HZS15-3
Q2215	5328961	TRANSISTOR 2SA1037KS(FS)	ZD 701	5330322	DIODE HZ9B
Q2216	5328961	TRANSISTOR 2SA1037KS(FS)	ZD 702	5331588	DIODE RD2.7E-B2
Q2217	5328961	TRANSISTOR 2SA1037KS(FS)	ZD 703	5330312	DIODE HZ7B SI ZENER 1MHZ 0.4W
Q2218	5328971	TRANSISTOR 2SC2412KR(BR)	ZD 851	5339101	DIODE HZ7B
Q2219	5328971	TRANSISTOR 2SC2412KR(BR)	ZD 852	5339101	DIODE HZ7B
Q2220	5326491	TRANSISTOR IMX1(X1)	ZD 901	5339271	DIODE HZS9A2
Q2221	5328971	TRANSISTOR 2SC2412KR(BR)	ZD 902	5339262	DIODE HZS6-C2
Q2222	5328971	TRANSISTOR 2SC2412KR(BR)	ZD 903	5339262	DIODE HZS6-C2
Q2223	5328793	TRANSISTOR DTC144K-26	ZD 904	5339262	DIODE HZS6-C2
Q2224	5328793	TRANSISTOR DTC144K-26	ZD1490	5339256	DIODE HZS30
Q2225	5328793	TRANSISTOR DTC144K-26			
Q2226	5328793	TRANSISTOR DTC144K-26			TRANSFORMERS
Q2301	5328793	TRANSISTOR DTC144K-26	T 501	5261352	OSC COIL
Q2302	5328791	TRANSISTOR DTC124K(25)	T 502	5261351	COIL,OSC
Q2303	5328971	TRANSISTOR 2SC2412KR(BR)			
Q2304	5328793	TRANSISTOR DTC144K-26			COILS
Q2305	5324631	TRANSISTOR 2SA1390C	L 201	5159077	CHOKE COIL 100UH+-10%
Q2306	5328793	TRANSISTOR DTC144K-26	L 202	5159154	CHOKE COIL 100UH
Q2307	5322731	TRANSISTOR 2SA952	L 203	5121175	COIL 22UH
QR 601	5327073	TRANSISTOR DTC144ES	L 204	5159077	CHOKE COIL 100UH+-10%
QR 602	5327073	TRANSISTOR DTC144ES	L 206	5121182	CHOKE COIL 68UH
QR 603	5327073	TRANSISTOR DTC144ES	L 208	5159077	CHOKE COIL 100UH+-10%
QR 604	5327074	TRANSISTOR DTA144ES	L 209	5121173	COIL 15UH
QR 605	5327073	TRANSISTOR DTC144ES	L 211	5121174	COIL 18UH
QR 606	5327073	TRANSISTOR DTC144ES	L 213	5159081	CHOKE COIL 180UH
QR 607	5327073	TRANSISTOR DTC144ES	L 214	5153034	CHOKE COIL 18UH
QR 608	5327073	TRANSISTOR DTC144ES	L 215	5121178	CHOKE COIL 39UH
QR 609	5327073	TRANSISTOR DTC144ES	L 216	5159077	CHOKE COIL 100UH+-10%
QR 610	5327073	TRANSISTOR DTC144ES	L 217	5121176	COIL 27UH
QR 611	5327073	TRANSISTOR DTC144ES	L 218	5121178	CHOKE COIL 39UH
QR 612	5327073	TRANSISTOR DTC144ES	L 219	5121176	COIL 27UH
QR 613	5327073	TRANSISTOR DTC144ES	L 220	5153031	CHOKE COIL 10UH
QR 614	5327073	TRANSISTOR DTC144ES	L 221	5159077	CHOKE COIL 100UH+-10%
QR 615	5327073	TRANSISTOR DTC144ES	L 223	5159077	CHOKE COIL 100UH+-10%
QR 620	5327073	TRANSISTOR DTC144ES	L 225	5121179	CHOKE COIL 47UH
QR 701	5327084	TRANSISTOR RT1P441S	L 226	5152607	CHOKE COIL 100UH
QR 702	5327082	TRANSISTOR RT1N441S	L 301	5159089	CHOKE COIL 820UH+-10%
QR 703	5327082	TRANSISTOR RT1N441S	L 302	5159115	COIL 2200UH
QR 801	5327073	TRANSISTOR DTC144ES	L 303	5153012	CHOKE COIL 68UH
QR 802	5327073	TRANSISTOR DTC144ES			
QR 901	5327073	TRANSISTOR DTC144ES			

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
L 304	5159143	CHOKE COIL 15UH	CP 203	5163801	LC FILTER
L 305	5159077	CHOKE COIL 100UH+-10%	CP 204	5163834	LC FILTER
L 306	5159113	COIL, CHOKE 8.2MH	CP 205	5163912	LC FILTER
L 307	5159077	CHOKE COIL 100UH+-10%	CP 206	5163941	LC FILTER
L 308	5159077	CHOKE COIL 100UH+-10%	CP 207	5163913	LC FILTER
L 310	5159158	CHOKE COIL 220UH	CP 301	5785388	DELAY LINE
L 351	5159156	CHOKE COIL 150UH	CP 302	5164702	LC FILTER
L 352	5159111	CHOKE COIL 8.2UH	CP 303	5164711	FILTER
L 353	5159077	CHOKE COIL 5.6M+-10%	CP 304	5164701	LC FILTER
L 354	5159077	CHOKE COIL 100UH+-10%	CP 401L	5163021	LOW PASS FILTER
L 401L	5130421	COIL	CP 401R	5163021	LOW PASS FILTER
L 401R	5130421	COIL	CP 502	5163103	BAND PASS FILTER
L 501	5159077	CHOKE COIL 100UH+-10%	CP 503	5163104	BAND PASS FILTER
L 502	5159114	COIL 15MH	CP 504	5163103	BAND PASS FILTER
L 503	5159114	COIL 15MH	CP1501	5163204	COIL
L 504	5159081	CHOKE COIL 180UH	CP2201	5163863	LC FILTER
L 505	5159154	CHOKE COIL 100UH	CP2202	5163835	LC FILTER
L 506	5159111	CHOKE COIL 5600UH	CP2203	5163901	LC FILTER
L 702	5152349	CHOKE COIL 820UH	CP2204	5163933	LC FILTER
△ L 851	5273341	LINE FILTER	CP2205	5163863	LC FILTER
L 901	5159077	CHOKE COIL 100UH+-10%	CP2208	5163314	FILTER
L1401	5159077	CHOKE COIL 100UH+-10%	DG 701	5315031	INDICATOR TUBE
L1402	5159085	CHOKE COIL 390UH	△ F 850	5720179	FUSE 1A
L1403	5159077	CHOKE COIL 100UH+-10%	△ F 851	5721064	FUSE 2.5A
L1404	5121177	CHOKE COIL 33UH	△ F 852	5721061	FUSE 1.6A
L1405	5159077	CHOKE COIL 100UH+-10%	△ F 853	5720171	FUSE 315MA
L1501	5159077	CHOKE COIL 100UH+-10%	△ F 855	5720171	FUSE 315MA
L1502	5159077	CHOKE COIL 100UH+-10%	IR 701	5477541	MODULE GP1U521H
L1503	5159077	CHOKE COIL 100UH+-10%	J 701	5673761	JACK
L1504	5159077	CHOKE COIL 100UH+-10%	J1501	5691001	CONNECTOR
L2201	5159077	CHOKE COIL 100UH+-10%	J1502	5694611	CONNECTOR
L2202	5159077	CHOKE COIL 100UH+-10%	JK1251	5677451	MINI CONNECTOR
L2203	5159141	CHOKE COIL 10UH	JK1252	5677461	MINI CONNECTOR
L2204	5153012	CHOKE COIL 68UH	LV 701	5317102	LEVEL METER
L2205	5159077	CHOKE COIL 100UH+-10%	PH2301	5340365	THERMISTOR ERT-D2FGL332G
L2206	5159051	COIL, CHOKE 1UH+-10%	PH2302	5340365	THERMISTOR ERT-D2FGL332G
L2302	5159077	CHOKE COIL 100UH+-10%	PH2303	5340365	THERMISTOR ERT-D2FGL332G
L2303	5159077	CHOKE COIL 100UH+-10%	S 141	5635321	SWITCH
L2304	5159077	CHOKE COIL 100UH+-10%	S 142	5635331	SWITCH
L2305	5159077	CHOKE COIL 100UH+-10%	S 143	5601371	SWITCH
L2306	5159077	CHOKE COIL 100UH+-10%	S 701	5635061	SWITCH
L2307	5159149	CHOKE COIL 47UH	S 702	5635061	SWITCH
L2308	5159137	CHOKE COIL 5.6UH+-10%	S 703	5635061	SWITCH
L2309	5159137	CHOKE COIL 5.6UH+-10%	S 704	5635061	SWITCH
L2310	5159149	CHOKE COIL 47UH	S 705	5635061	SWITCH
CRYSTALS			S 706	5635061	SWITCH
X 701	5781581	CRYSTAL	S 707	5635061	SWITCH
X 702	5783001	CRYSTAL	S 710	5635061	SWITCH
X2701	5781981	CRYSTAL 8.0MHZ	S 711	5635061	SWITCH
CE 901	5781981	CRYSTAL 8.0MHZ	S 712	5635061	SWITCH
MISCELLANEOUS			S 713	5635061	SWITCH
BL 501	5272375	LINE FILTER	S 714	5635061	SWITCH
BL 502	5272375	LINE FILTER	S 715	5635061	SWITCH
BL 503	5272375	LINE FILTER	S 716	5635061	SWITCH
BL 504	5272375	LINE FILTER	S 718	5635061	SWITCH
BL1401	0239055	LINE FILTER	S 719	5635061	SWITCH FOR VT-S85E(VPS)
BL1402	0239055	LINE FILTER	S 721	5635061	SWITCH
BL1403	5272372	CORE	S 722	5635061	SWITCH
BZ1501	5409272	BUZZER	S 723	5635061	SWITCH
CP 201	5163951	LC FILTER	S 724	5635061	SWITCH
CP 202	5164731	LC FILTER	S 725	5635061	SWITCH
			S 726	5635061	SWITCH
			S 728	5635061	SWITCH
			S 737	5635061	SWITCH
			S 751	5635061	SWITCH

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
S 752	5622183	SWITCH			
S 755	5621441	SWITCH			
S 756	5622183	SWITCH			
S 757	5622183	SWITCH			
S 758	5622183	SWITCH			
S1501	5622562	SWITCH			
S1502	5622562	SWITCH			
TH 201	5340361	THERMISTOR ERTD2FHL			
TH 202	5340363	THERMISTOR ERTD2FHL			
TH 203	5340363	THERMISTOR ERTD2FHL			



# MECHANICAL PARTS LIST (LISTE DER MECHANISHEN TEILE)

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
FOR FINAL ASSEMBLY			212	6415542	REEL-TAKE UP
101	6003485	COVER, TOP	213	7789122	POLYSLIDER WASHER
102	7741443	FELT	214	6975766	ARM, PRESSER ROLLER
103	6003503	COVER, BOTTOM	215	6804274	SLIDER BLOCK
104	6064752	INSULATOR(L)	217	7412816	GEAR, LOADING (L)
105	6064762	INSULATOR(R)	218	7412806	GEAR, LOADING (R)
106	6714211	NYLON RIVET - 3MMD	219	6911551	GUIDE ROLLER BASE(IN)
107	6232625	PANEL, FRONT(CT)	220	7412822	PLATE
107	6232626	PANEL, FRONT(VPS)	221	6911572	BRACKET
108	6230255	PANEL, REAR	222	6911002	BASE, CYLINDER
109	6248531	DOOR, CASSETTE	223	5446641	HEAD-FULL ERASE
110	6077291	ROTARY KNOB	224	6897475	ARM, IMPEDANCE
111	6077293	KNOB	225	4508237	GUIDE, TAPE
112	6078481	KNOB, SLIDE	226	6555431	SPRING
113	6078931	KNOB, SLIDE	227	7413665	HOLDER-BAND
114	7417001	BRACKET	228	7412863	ARM
115	7448441	BRACKET	229	6555444	SPRING
116	6800971	STUD	230	6897264	HOLDER
117	6407471	COVER, FUSE	231	6896751	ARM
118	6231081	PIECE, REAR	232	6555061	SPRING
119	5690315	PLATE, JACK	233	4508235	GUIDE
△ 120	5850722	CORD	235	7429684	BLOCK, LOADING
△ 121	6794591	BUSHING	236	7428085	BRCKET
122	6800781	HOLDER, DISPLAY	237	7412881	ARM
123	6869311	COVER	238	6976551	ARM
124	6800201	HOLDER, LED	239	7412892	ARM
125	6229772	HOLDER, LED	240	7428072	ARM, OPERATION
126	6878962	HOLDER	242	6551151	SPRING
128	6234201	PANEL, REAR	243	6804791	BRAKE
△ 129	5214052	TRANSFORMER, POWER	244	6896894	HOLDER, MOTOR
130	5589112	RF CONVERTER	246	6897251	ARM
131	5588062	TUNER IF BLOCK	247	6555483	SPRING
132	6800081	CBA SUPPORT	248	6897271	ARM
133	6800091	CBA SUPPORT	249	6897065	GEAR, MODE
134	6800092	SUPPORTER, PWB	250	6434861	WORM WHEEL
135	5885982	CABLE, PLUG	251	6555052	SPRING
138	6231716	DOOR, CONTROL(CT)	252	7799012	WASHER
138	6231718	DOOR, CONTROL(VPS)	253	7786623	POLYSLIDER WASHER
139	6063641	BUTTON, EJECT	254	6898472	ARM, IDLE
140	7493692	SHIELD PLATE	255	6976371	ARM
141	6809461	HOLDER	256	5601371	SWITCH
142	6800951	PLATE, JACK	257	8711104	SCREW(2X4)
143	6800961	BRACKET	261	1378092	PWB ASSY PRE-REC AMP
144	7741446	FELT	271	7415782	BRACKET
145	7674011	CUSHION	272	7415793	BRACKET
146	7793732	HOLDER, TRANSFORMER	301	5571382	MOTOR, CAPSTAN
147	6675023	HEAT SINK	302	6896951	CLUTCH BASE ASSY
148	7417402	BRACKET	303	6351555	BELT
149	6795151	RIVET	304	6897095	ARM, FF/REW
150	6714215	NYLON RIVET	305	6434851	RACK
151	7798451	PLATE, SHIELD	402	7412575	BRACKET, SIDE(R)
153	7707661	COVER	403	6804542	BRACKET, SIDE(R)
154	7425781	PLATE	404	6896971	WORM WHEEL ASSY
202	6911101	SCREW	405	6435571	WORM
203	7412852	BASE-ACE HEAD	406	4508221	WORM SHAFT
204	5446631	HEAD-AUDIO CONTROL	407	6896632	ARM-SWITCH
205	6304906	SPRING	408	6897041	ARM-SWITCH
206	6522752	SPRING	409	6302474	SPRING
207	7785673	NUT	410	6896623	ARM, DOOR
208	6896914	HOLDER	411	7412583	BRACKET-GEAR
209	6555501	SPRING	412	7449172	HOLDER, CASSETTE
210	6415532	REEL, SUPPLY	413	7449162	BASE, CASSETTE HOLDER
211	7789123	POLYSLIDER WASHER	414	6896664	HOLDER, CASSETTE (R)
			415	7428113	HOLDER, STAY
			416	6806641	ARM

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
417	6897001	ARM			
418	6555043	SPRING			
419	6896673	HOLDER,CASSETTE (L)			
420	7412944	ARM			
421	6555771	SPRING			
422	7412952	SPRING			
423	6806521	HOLDER,FRONT			
424	7580791	SHAFT ASSY			
425	7428981	BRACKET,SIDE(L)			
426	6323724	SPRING			
427	7794391	WASHER			
501	5436089	CYLINDER ASSY			
503	5571602	MOTOR,CAPSTAN			
504	5792633	BRUSH			
901	8699410	SCREW(3X10)			
902	7784428	SCREW (M3)			
903	8744412	BINDING SCREW 3MMDX12MM			
904	7781582	FALT SCREW-3MMDX10MM(BLACK)			
905	8699412	SCREW (3X12) BLACK			
907	8691408	SCREW (3X8)			
908	8741416	BIND HEAD SCREW 3MMDX16MM			
909	7785351	SCREW (4X14)			
910	8691408	SCREW (3X8)			
911	7781581	SCREW			
912	8691410	SCREW (3X10)			
951	8691410	SCREW			
952	8691310	SCREW			
953	8699408	SCREW			
954	7781872	SCREW-3MMDX8MM			
955	7773086	SCREW			
956	8741414	SCREW (3X14)			
957	8691412	SCREW (3X12)			
958	8691408	SCREW (3X8)			
959	8741408	SCREW (B3X8)			
960	8741412	SCREW (B3X12)			
961	7785941	SCREW			
962	8711404	SCREW - 3X4 PAN HEADSCREW			
FOR ACCESSORIES					
802	5857111	YC CABLE			
803	5858311	CONNECTION CODE			
804	5747741	CONNECTOR CORD			
805	5614183	REMOTE HAND SET			
FOR REMOTE CONTROLLER UNIT					
1	5614061	COVER			
2	5614281	CASE,UPPER			
3	5614062	PLATE,CLEAR			
4	5614066	LID,BATTERY			
5	5614063	CASE,BOTTOM			

[illegible]

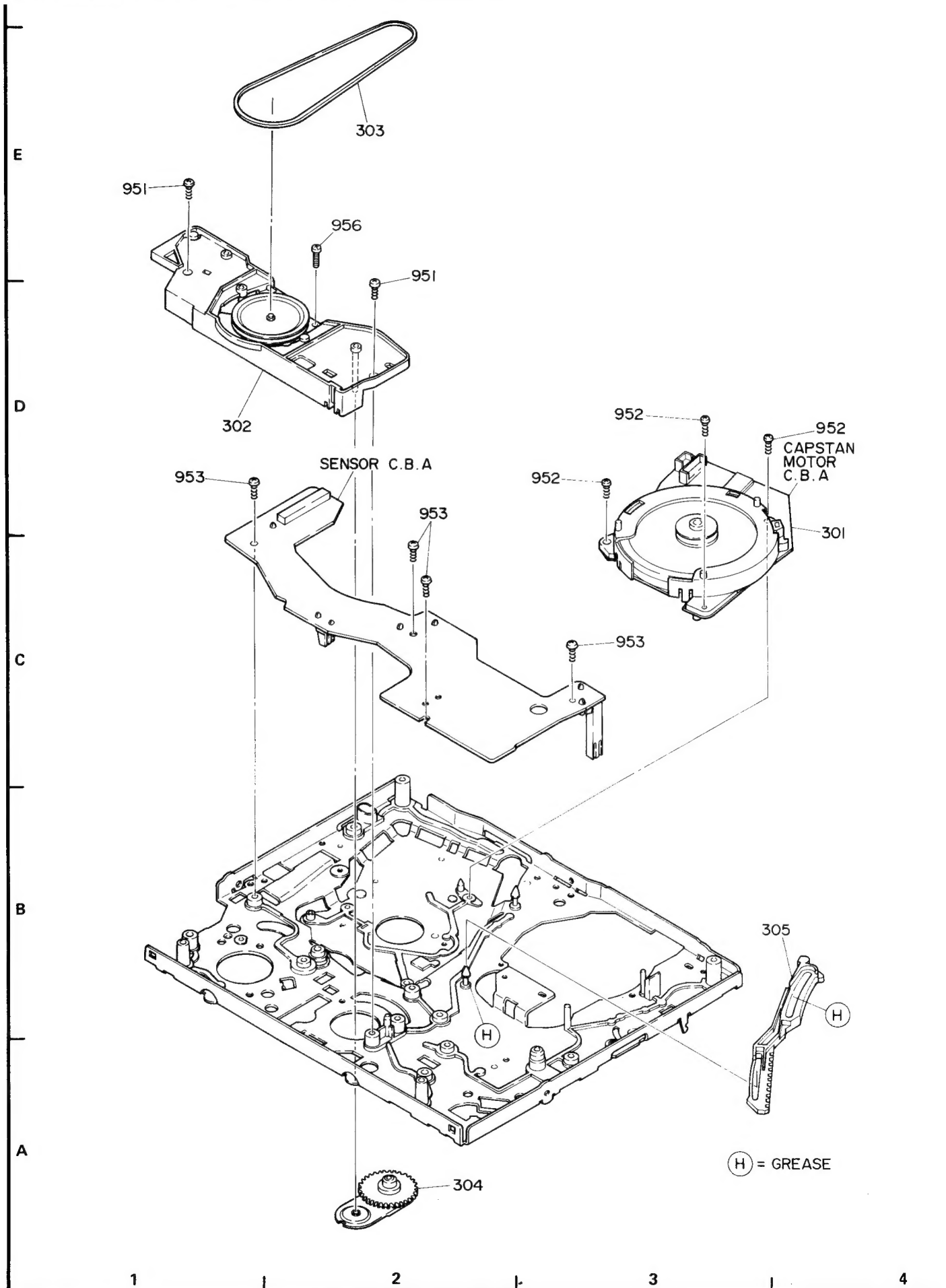
Exploded view diagram of a mechanical assembly. The diagram shows various components labeled with numbers and letters. The legend indicates: (H) = GREASE, (S) = OIL.

Key components and labels include:

- 420, 421, 422, 419, 415, 413, 414, 417, 416, 418, 403, 404, 405, 406, 407, 408, 409, 410, 411, 423, 424, 425, 426, 427
- Letters: (H), (S), (A)



# CHASSIS (II) SECTION (CHASSIS II)



(H) = GREASE